

Railway Maintenance Engineer

Volume 14

June 1918

Number 6

(With which is incorporated the Engineering and Maintenance of Way Edition of the *Railway Age Gazette* and *Railway Engineering and Maintenance of Way*.)

Published on the last Thursday preceding the date of issue by the
SIMMONS-BOARDMAN PUBLISHING CO.,
TRANSPORTATION BUILDING, CHICAGO, ILL.

NEW YORK: WOOLWORTH BLDG. CLEVELAND: CITIZENS' BLDG.
WASHINGTON: HOME LIFE BUILDING.
LONDON: QUEEN ANNE'S CHAMBERS, WESTMINSTER.

EDWARD A. SIMMONS, *President*. LUCIUS B. SHERMAN, *Vice-President*.
HENRY LEE, *Vice-President and Treas.* M. H. WIUM, *Secretary*.
H. H. SIMMONS, *Business Manager*.

ELMER T. HOWSON, *Editor*.

WALTER S. LACHER, *Managing Editor*. JOHN G. LITTLE, *Associate Editor*.

Entered at the Post Office at Chicago, Ill., as mail matter of the second class.

Subscription price, including the twelve regular monthly issues of the *Railway Maintenance Engineer* and the four daily issues of the *Railway Age*, published in connection with the annual convention of the American Railway Engineering Association: United States, Canada and Mexico, \$1.00; foreign countries (excepting daily editions), \$2.00.

WE GUARANTEE that of this issue 7,800 copies were printed; that of these 7,800 copies, 7,111 were mailed to regular paid subscribers, 82 were mailed to advertisers, 101 were mailed to exchanges and correspondents, and 506 were provided for new subscriptions, samples, copies lost in the mail and office use, that the total copies printed this year to date were 48,600, an average of 8,100 copies a month.

The *Railway Maintenance Engineer* is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

CONTENTS

EDITORIALS	187
LETTERS TO THE EDITOR.....	189
WHAT CAN I DO TO ECONOMIZE ON CARS?	
SAVING CARS OF PRIMARY IMPORTANCE; JOHN EVANS.....	190
CONCENTRATE SHIPMENTS IN CENTRAL BUREAU; M. A. BOX AND F. C. KNIGHT.....	191
BRIDGE AND BUILDING MATERIALS; F. L. BURRELL.....	192
USING A SUPPLY TRAIN; S. C. TANNER.....	193
TESTING A PIPE BY AIR PRESSURE; E. L. SINCLAIR.....	194
SHOULD WORK BE DONE BY SECTION OR EXTRA GANGS?	
SECTION FORCES DO BETTER WORK; JAMES SWEENEY.....	195
EXTRA GANGS INCREASE OUTPUT; J. W. McMANAMA.....	196
EXTRA GANGS FOR RAIL AND BALLAST WORK ONLY; T. HICKEY	196
APPLYING PAINT WITH COMPRESSED AIR.....	197
EXTENSIVE IMPROVEMENTS APPROVED	197
THE MAKING AND DELIVERY OF TIES; NELSON C. BROWN.....	199
THE IMPORTANCE OF MISCELLANEOUS REPORTS; J. T. BOWSER.....	201
THE OPEN GATE; C. E. LINDSAY.....	202
ACTIVITIES OF THE RAILROAD ADMINISTRATION.....	203
REPAIR OF DRY STONE WALLS.....	206
STOP WASTE AND HELP WIN THE WAR.....	207
DURABILITY OF UNTREATED PILING ABOVE LOW TIDE.....	209
SERVICE RESULTS WITH THE TIE TAMPER; G. W. VAUGHAN.....	210
MATERIAL MARKET	212
GENERAL NEWS	213

The long-looked-for report of the wage commission appointed by Director General McAdoo to investigate the compensation of railway employees made its appearance on Monday, May 6, and was received by railway workers with rather mixed feeling, particularly when it was learned that the proposed wage advances prescribed therein applied to rates in effect in December, 1915, rather than in December, 1917. The document constitutes a comprehensive study of the system of compensation in effect on railroads, and its recommendations are founded on several well defined basic principles. Primary among these is that the wage advance is desired to compensate for the marked advance in the cost of living, and that the increase should therefore be given primarily to those whose wages are almost entirely consumed by bare living expenses. Another is that while there are now gross inequalities in the wages paid different classes of labor, brought about largely through differences in the bargaining power of the various groups of employees, an attempt to overcome such distinctions at the present time is not deemed desirable. Some criticism has been directed at the recommendations because the rates of advance apply to those in effect so long ago as two years, rather than the beginning of this year, but no more effective and simple method could have been devised for affording proportionately larger increases to those who had not received material advances during the last two years than for those who had. In putting this plan into effect on May 25, the Director General made some modifications, among which is a provision for an advance of at

least 2½ cents per hour for day laborers over the rate paid on December 31, 1917.

If every maintenance man will realize that by doing his regular work in the most efficient way possible, he is helping to win the war, much will have been accomplished. In England the four million women who have entered the munition plants and allied industries have shown unusual diligence in their work and have increased the output far beyond that which had been thought possible heretofore, prompted by their desire to aid their men in the trenches. The railways are essential to the success of our country in the war and the proper maintenance of the tracks and structures is necessary to the operation of the roads. If each foreman responsible for the maintenance of tracks, structures or water stations realizes that he has no small share in the successful operation of the railways and through them in the transportation of supplies to our men at the front, it will give him the incentive to develop means of overcoming the difficulties now confronting him. The greatest danger which now faces the maintenance of way department is that the foremen will become discouraged with the lack of labor or its inefficiency or with their inability to secure the desired materials and that, accepting these conditions as excuses, they will relax their vigil and allow these difficulties to overwhelm them instead of fighting their way through and maintaining the properties intrusted to them in spite of these handicaps. The country needs fighters on the railroads as well as in the army, for the men in the trenches can fight only as

Winning the War

they are supplied with food and ammunition by their compatriots at home. This is a period which is taxing the ability and the loyalty of every railway man whether he be a laborer in the gang or a general manager.

MOTOR TRUCKS FOR HANDLING SUPPLIES

ONE OF THE CONTRIBUTORS to the contest on the conservation of equipment by the maintenance of way department, whose paper is published on another page, suggests the use of motor trucks to distribute materials on terminal divisions. In this suggestion he points out an opportunity for improvement from the standpoint of the maintenance of way as well as the operating department. As commonly handled, materials required for routine repair or for improvement work at any point on a terminal are loaded in cars at the store house and are then switched to the point desired in the regular manner. Although these cars may be moved only a relatively short distance and may carry only a small amount of material, several days may elapse before the cars are placed at the point of delivery, not only incurring the possibility of delaying the work, but also keeping the car out of revenue-earning service for this length of time. The motor truck is an economical substitute for the ordinary switching service at any point where it is necessary to move a considerable amount of material in small quantities and in a limited area. Its first cost will compare favorably with that of a car and the expense of operation will usually be less when the small size of the average shipment is considered. Furthermore, deliveries can be made much more promptly, in this way, reducing delays to gangs and thereby the cost of the work. Particularly under the present conditions the motor truck warrants consideration in locations of this character.

THE OPPORTUNITY TO SAVE MATERIALS

THERE HAS NEVER been a time when it has been so important to conserve materials as now. Not only have prices risen greatly, but supplies of almost all kinds are difficult to secure at any price. Furthermore, in many instances, these materials can only be secured at the expense of war materials. There is, therefore, every incentive for the conservation of materials. Opportunities for savings of this character are not confined to those in charge of departments, but are presented to a greater or less extent to every man who uses materials in any way. The track laborer who throws a spike into the weeds along the fence contributes just as directly to the loss of materials as the roadmaster or the division engineer who knowingly permits his forces to follow wasteful practices. The Northern Pacific has adopted an interesting method of bringing this subject to the attention of its maintenance forces, which is described in another column. Some time ago a circular letter was sent to all of the foremen asking for suggestions regarding ways in which material and labor could be conserved. These suggestions have been combined into a circular letter which has been sent to all officers in the maintenance of way department from section foremen up, for their information and guidance. In this circular opportunities for conservation are presented to their men in terms with which they are readily familiar and, therefore, in a way to make the greatest impression upon them and to be most effective. The roads cannot afford to overlook opportunities of presenting this subject to their men of all ranks and least of all at the present time.

THE FUTURE OF THE ASSOCIATIONS

WHAT IS THE FUTURE of the voluntary railway associations? This question is causing much concern among those interested in the work these organizations are doing. There are at present five societies which are organized to study the problems arising in the engineering and maintenance of way departments—the American Railway Engineering Association, the American Railway Bridge and Building Association, the Roadmasters' and Maintenance of Way Association, the American Wood Preservers' Association and the Maintenance of Way Master Painters' Association. Following the taking over of the railways by the government and the assumption of responsibility for operating expenses, notice was given that the roads might continue until April 30 to support those associations to which they had contributed in the past. Shortly before that date most of the railway associations, including all of those mentioned above, were approved and the continuance of support authorized. Scarcely had this approval been secured when the presidents of several of the larger railway associations were called to New York to discuss a plan for the amalgamation of the associations in the railway field in one composite organization. It was stated at this meeting that this amalgamation reflected the desire of the Director General to have one central organization to which he could turn for assistance in the solution of any problem which might arise. It was also intimated that by making this association official in character, the standards adopted by it could at once be imposed upon the roads.

In the development of the plan proposed at this meeting, the individual associations would lose a large part or all of their individual identities and thereby their freedom of action and initiative. If this should be done the activities of the associations would be so curtailed as to largely destroy their value. These associations have been formed by the binding together of men with mutual professional interests and desirous of the opportunity of meeting for the discussion of their common problems. They are supported by the membership fees paid by the men individually, relatively few of whom are reimbursed by the roads.

The fact that these associations are composed of members in their individual capacities has been one of the strongest factors contributing to their success. The men have been free to express their personal opinions without speaking in any way as the representatives of their roads. This has led to much freer discussion and exchange of information than would be possible if their statements were to be interpreted as reflecting the attitude of the roads.

The amalgamation of the railway associations into one central body will very largely restrict the activities of the larger societies in this field, such as the American Railway Engineering Association, and will result in the almost entire elimination of the smaller associations. This in itself will be a loss for which the railways will suffer, for valuable as is the work of the American Railway Engineering Association, it cannot replace the other organizations of men in subsidiary positions. The smaller associations confine their work to the problems confronting their members and the discussions reflect the viewpoint of these men. In these days when the maximum efficiency is required from every man in railway service, from president to laborer, it is more important than ever that every means be taken to increase the efficiency of the men in all ranks. The secondary associations have accomplished and are accomplishing much in this direc-

tion among their members and are doing a work which the railways whether under government or private control can ill afford to lose.

There is an opportunity for the co-ordination of the work of these associations to remove all overlap and more particularly to direct the work of all of the associations along the common lines necessary to the winning of the war. Such co-ordination, if intelligently administered, is advisable and will be welcomed by the associations. However, the proposal to amalgamate these organizations into one central body under the control of the Railroad Administration and make it official in character will result in the cessation of most if not all of the excellent work which these associations are now doing.

SOME WATER SERVICE PROBLEMS

WHILE THE SUPERVISOR of water service may not be confronted with as acute problems as his associates in the track and bridge departments the changed conditions under which he is working are requiring the modification of many practices. An adequate supply of water for locomotive use is essential to the operation of a road. With the great development in traffic and the corresponding increase in the consumption of water the provision of a sufficient supply is taxing the capacity of many stations necessitating their immediate reconstruction and enlargement. This provides an opportunity for the selection and installation of modern equipment designed for the service at that particular station which will not only provide the desired capacity, but will also result in more economical operation.

In planning for new stations or extensive alterations to existing ones, one comes face to face with the material situation which requires still further modification in plans to utilize the supplies which can be secured most readily. For instance, the conditions in the steel industry have created a marked change in the relation between the relative costs of steel and wooden tanks and have led to numerous changes in standards.

The fuel problem is an important one for water service men to consider. While the amount of coal used is relatively small compared with that burned in locomotives, it is large enough to afford opportunities for marked economies. With the practical certainty that there will be a severe shortage of coal next winter any waste which can be eliminated through more economical use is of service to the nation while effecting a saving in cost of operation. The same relative condition exists with reference to plants operating on gasoline and other grades of oil.

Another very important problem for the water service department to consider at the present time is that of the treatment of locomotive water. The country suffered severely from a shortage of motive power last winter and the indications are that this situation will not be relieved materially for some time. It is, therefore, important to get the maximum service out of every engine. One of the conditions contributing to non-productive time on the part of a locomotive is bad water. If the water can be prepared before it enters the locomotive so as to contain the minimum amount of incrusting solids the road mileage of engines can be increased materially, while their efficiency on the road will also be increased. As the initiative for the investigation of water-treating projects rests largely with the engineering department and more directly in that branch having to do with water service, the men in this service can do the most constructive work for the roads at the present time by giving careful attention to this important subject.

LETTERS TO THE EDITOR

ESSENTIALS OF JOINT MAINTENANCE

BELLEFONTAINE, OHIO.

TO THE EDITOR:

A joint needs daily attention. To start with a good angle bar should be used. It should be well oiled before being applied, and should be so applied as to fit up snug to the rail. Good bolts should be used and they should be oiled twice each year. Good nut locks should also be used, and should be so applied as to leave the open place in the lock on top so the oil can reach the bolt and spread out over the threads.

Good ties should be used at joints. It is not necessary to have extra large ties, but rather those under the joints should be the same size as the others. Ties should be well spiked and kept firm under the rail. I find it a good policy when surfacing to tap down the spikes before tamping the ties, and then to tighten the bolts as soon as I get the joints tamped. Rails should not be too tight nor too open for a good joint, so it is necessary to maintain the proper expansion.

B. E. HUSTON,
Yard Foreman, Cleveland, Cincinnati, Chicago & St. Louis.

SURFACING BALLASTED TRACKS

ST. JOHNS, KAN.

TO THE EDITOR:

Where traffic is heavy and fast, low spots soon develop in the track and a foreman must be constantly on the lookout for them and keep them repaired, pulling the low places up to the general surface of the track. The level board should always be employed in spotting up low places. On tangent track, when inspecting rough places with the level board before commencing repairs, one should ascertain which rail runs low generally, then raise the higher rail, if need be by eye, to good surface and bring the lower rail to level with the board. In spotting up curves always raise the low places on the inside rail first by eye, giving the outside rail the proper elevation with the level board after the inner rail has been brought to grade.

To avoid leaving a line swing in the track when lining track, do not stand too close to the men. One should not be closer than six rails at any time unless it is only to throw out a few small kinks. When lining curves one should use the outside rail for the line rail and the inside rail for the gage. However, where track has spread much it should be gaged back on the same side on which it spread before one attempts to line it if one is to obtain the best results.

Where tamping picks are used when spotting up track, the men should remove the ballast from the end of the tie well back under the rail, tamping every other tie on the ends first to avoid humping the track. After the ballast has been removed from the end of the tie the men first use their pick points enough to loosen up about a half inch of the top of the tie bed on light raises so that the new ballast can be forced under the tie with the tamping end without pulverizing it too much. This is very essential and should not be overlooked. On less important lines where dirt or light ballast is used these methods may also be followed except that the tamping should be done with shovels equipped with iron handles or by light tamping bars.

V. H. SHORE,
Section Foreman, Atchison, Topeka & Santa Fe.



WHAT CAN I DO TO ECONOMIZE ON CARS?

Several Men Describe Methods by Which This Problem Can Be Solved
in the Maintenance Department Without Affecting the Service

THAT THE IMPORTANCE of the conservation of equipment at the present time is realized by maintenance of way men is evidenced by the discussions which we received in the contest on The Conservation of Equipment by the Maintenance of Way Department, which closed on April 10. These contributions were referred to W. J. Towne, assistant general manager of the Chicago & North Western; W. H. Penfield, engineer of track maintenance of the Chicago, Milwaukee & St. Paul, and L. G. Curtis, assistant chief engineer, Baltimore & Ohio, who awarded first prize to the discussion prepared by John Evans, division engineer of the Michigan Central at Detroit, Mich., and second prize to the paper presented by M. A. Box, roadmaster, and F. C. McKnight, roadmaster's clerk, Kansas City Southern, Neosho, Mo. The two prize-winning and two other papers are published below and others will appear in later issues.

FIRST PRIZE—SAVING CARS OF PRIMARY IMPORTANCE

By JOHN EVANS,

Division Engineer, Michigan Central, Detroit, Mich.

In considering means of conserving equipment, it should be borne in mind that, under present conditions, extraordinarily radical measures are justified in reducing the time cars are held under load. The labor or money expenditure involved in effecting this conservation is, within broad limits, a matter of secondary importance. Maintenance of way employees should understand that, outside of emergency repair work, their most important business is the prompt handling of cars of company material. Routine maintenance work should not be allowed to interfere with this.

As shippers, maintenance employees can aid in car conservation by the intelligent selection of loading points when there is more than one place from which shipment can be made; by loading cars as soon as placed; by loading to capacity; by promptness and care in carding and billing and by sending consignee immediate and complete notice of shipment.

Where material to be shipped is available at more than one point, consideration should be given to the amount of switching necessary and the amount of time apt to be required in getting the empty car to the point of loading

and in getting the loaded car from point of loading to destination. There is no need to elaborate on the advantages to be derived from prompt and full loading.

In carding and billing, care should be used to make shipping instructions correct, clear and complete. This is particularly important on shipments into large terminals. On these shipments the particular yard and track to which cars are destined should be shown. If shipments involve a large number of cars, the operating department should be consulted on making out the billing so that any additional information which might facilitate movement or tend to avoid confusion may be shown. For example, if the cars on their arrival at the terminal to which shipment is being made are classified into groups, the group classification might with advantage be shown on the carding and billing. In making orders or requisitions, special attention should be given to the shipping instructions shown on same.

The shipper should lose no time in sending notice to consignee. If the shipment arrives in advance of this notice, it is frequently necessary to defer unloading while the consignee is trying to find out where the material is from and what work it is to be used on. On account of the possibility that car cards may have been made out incorrectly and also on account of the liability of cards becoming lost or misplaced, it is not advisable to take them as authority for unloading cars in the absence of notice from the shipper. All parties handling shipping information between loader and consignee should give the forwarding of this data preferred attention.

Foremen should be educated to take an interest in helping to avoid delays to shipments of company material, no matter to whom consigned. They should examine the carding of call cars which they see loaded with such material and make report to their superiors, in case the moving of the car does not seem to be getting proper attention. If there is not marking on the shipment to indicate the destination a report should be made giving the car number and information as to the contents so that the shipment can be traced. Foremen, when coming in contact with foremen on adjoining territories, should cultivate the practice of giving any information which they may have obtained in regard to the location of shipments in which these latter foremen may be interested.

As consignees, maintenance employees can help in saving cars by giving the operating department early and

explicit instructions for placing shipments for unloading and by the immediate unloading of cars when placed.

A foreman should be given to understand that he is responsible for getting the car placed and should advise his superior, in case his request for placing is not complied with within a reasonable time. The interests of the maintenance and operating departments in the prompt release of cars are mutual and the matter will be taken care of, if called to the attention of the proper authorities. Therefore, in case of serious delay in unloading the cars, the excuse that car was not placed should not be accepted.

In some cases, in order to release equipment promptly, it may be advisable to unload material at points where a reasonable amount of rehandling will be necessary. On light traffic lines ties have been unloaded from side tracks on station grounds and afterwards taken out on the line on push cars hauled by motor cars. In this way the holding of the cars until a road train could be furnished or until the cars could be handled by local freight was avoided.

It is common practice to send cars over the line loaded with material, portions of which are for different stations. The car is left by local freight at each individual station where the material for that station is unloaded, and is then forwarded to the next unloading point by the local freight on the next trip. This car should be watched closely to see if, in case material can be handled conveniently, it cannot be released short of final destination and the remaining material forwarded as a load and un-load shipment by local freight. Letting the original car go forward to final destination is very apt to result in holding it for several days with practically no load.

The car shortage has been met by commercial shippers to some extent by the use of motor trucks in both long and short hauls. There are localities where the use of teams or trucks in handling maintenance of way material offers a promising field. This is particularly the case around terminals where the amount of material to be moved is large and where the hauls on cars, though short in distance, require a great deal of time on account of the slowness of yard movements.

Frogs, switches and lighter material can be transferred from one point to another in the terminal by teams of trucks, thus doing away with the use of cars altogether. It would be possible, by the use of trucks, to assemble certain classes of material for shipment at some fixed loading point, such as a freight house or transfer house, from which the material could go forward as part of a carload, instead of, perhaps, being shipped as a small load if sent from the point at which the material happened to be on hand. In addition to the saving in cars which would result from the use of motor trucks, there is also to be considered the benefit to be derived from the quicker delivery of the material.

In some cases, cinders might be hauled away from cinder pits by teams or trucks, instead of loading them into cars. This would not be advantageous at pits where cinders are loaded into cars by mechanical means, as the rehandling necessary would not be justified. In the winter time there is little demand for cinders in track work and cars loaded with them are apt to be held unusually long, on account of the difficulty in unloading them after the cinders are frozen. Also the unloading of cinders in winter time is apt to be delayed while emergency maintenance work is being taken care of. If there is vacant space adjoining the point where cinders accumulate, these cinders made in the winter might be piled up until spring, when they could be loaded by a clam shell or some such machine and disposed of with

but little delay to the cars used. On account of the rehandling necessary, this storage of cinders would not be advisable at points where mechanical means are provided for loading cinders as soon as dumped from locomotives.

An ample equipment of locomotive cranes and rail loaders is a very decided help in securing the prompt unloading of cars.

SECOND PRIZE—CONCENTRATE SHIPMENTS IN CENTRAL BUREAU

By M. A. Box, Roadmaster, and F. C. McKnight,
Roadmaster's Clerk,
Kansas City Southern, Neosho, Mo.

Centralization of responsibility, with a directing head, is essential to any scheme which will effect the efficient handling of company material with the fewest possible number of cars. For this reason, in so far as it is possible to do so without encroachment on the powers of any department, it would be wise to create a subdivision in an appropriate department vested with authority to plan and direct the assembling, transportation and distribution of company material, or with authority to determine and exact certain requirements of any department wishing the use of cars for such work. Such a subdivision might be established in and conducted through the roadmaster's office with the following particular advantages: (1) This office is in direct control of permanent labor forces at all points of the road, by reason of which it could the more effectively arrange for the use of these forces in co-operation with other departments for the prompt release of rolling equipment without interference with the regular duties of such forces; and (2) the great bulk of company material is handled under the immediate direction of this office, by reason of which this office would have the problem well in hand at the outset and might, therefore, the more readily determine its solution.

An intelligence bureau should be established by the office in charge of the campaign for the conservation of cars for this work, which should function as an informant to the several departments as to the manner and time of obtaining cars for the shipment of company material and their proper handling in loading, moving and unloading after obtained. This bureau should issue a series of report sheets contemplated to cover each step in a car's history from the inception to the completion of its work in carrying a shipment of company material; so that each employee under whose immediate direction a car comes for company hauling would be required to submit a report to the proper authority directly upon finishing his work with the car, such report to contain, if from a section foreman, for example, the following information: "Date car arrived at station, date of request on agent for handling, purpose for which car was requested, date handled for loading or unloading, and date released or billed to some other point." All reports should further contain, when there is occasion for it, an explanation in brief detail of any delay in loading, moving or unloading the car; thus, when a request has been made on the transportation department to move a car, and an order accordingly given to local crew to move the car, the failure of the crew to move the car or the act of setting it out at any place short of its destination should require an immediate report by the conductor of the crew or the agent at the point where the car remains with an explanation of the reason why the car has been set out. By this system of reports the office in charge of the campaign for conservation in material cars will

be able to place its finger on the exact source of all delays and may thereby adjust and correct the difficulties more readily. It should further be the function of the intelligence bureau to solicit and consider suggestions from employees for the improvement of the work.

Close co-operation between the several departments should be stimulated by circular letters to all employees directing the work of loading, moving and unloading cars of company material. General and specific information should be sent to these employees, outlining the ways in which they can help in the work. Departments should be referred to the office in charge of the campaign for the means of closest co-operation, and the Intelligence Bureau should prepare statements for particular cases.

The general solution of the problem of cutting to the minimum the number of cars given to the use of hauling company material is to be found in the two-fold principle (1) of capacity loads and (2) immediate release of cars after the haul. This may be accomplished, as above indicated, only under the direction of a responsible head well informed regarding all of the necessary work to be done and with the complete co-operation of all the departments. For capacity loads the office in charge of the campaign shall be informed in advance by the department wishing to make a shipment of the necessity of the shipment reaching its destination, which should be named, at a certain time and of the amount of material to be shipped, so that the most favorable time for shipping may be ascertained and arranged for in the provision of the proper amount of car space, and so that where the shipment is to be of only a part of a car advantage may be taken of the opportunity to make a bunch car shipment or to group several shipments in the same car. To assure the immediate release of cars after hauling, it is just as essential that the department desiring to make a shipment give due notice to the office in charge, so that in case the department making shipment has not forces available at the point of destination to unload it, they may be arranged for by the directing office through the employment of the permanently established labor forces at such point, without hindrance to the regular duties of these forces.

Some definite suggestions for the department or office in direction of the work are as follows:

(1) Utilization of the local freight service for the assembling and distribution of small shipments of material, such as tie-plates, spikes, bolts, angle bars and switch material. Small shipments of these and other materials should be handled in merchandise cars by the local freight crews. In case such shipments are too bulky to be handled easily by the local freight crews arrangement could be made for the assistance of the section men at the several stations.

(2) When it is necessary to make shipments of a number of rails to be distributed to various sections of a division, the car containing such material should also be handled by a local freight. The section crew of each section where rail is to be unloaded should be on hand to take off its allotment, so that the car will not have to be set out, but may pass over the entire district in one day and be released for further service without delay.

(3) It might prove effective in avoiding a hindrance to the regular work of the section crews to arrange certain days for the shipment of company material and to have a special car pass over the district on those days, so that the section crews might order their work in such a way as to be working close by their stations on such days where they could lend assistance in loading or

unloading materials immediately when the car arrives on their sections, yet without embarrassment and delay to their regular work.

(4) The importance of foresight should be impressed on section foremen so that they will make their wants known before they become urgent. In this way it may be possible to prevent empty backhauls and to avoid the use of cars for small shipments to points where material cannot otherwise await the regular coming of a material car loaded to capacity with the requirements of all the sections along the district.

(5) By impressing the doctrine of "capacity loads" on work train foremen it is comparatively certain that a number of cars may be released from this branch of service without obstruction to its work.

(6) Special care should be taken to avoid moving materials from a point on the line where they are to be needed in a short time and to which points other like material will have to be brought to replace same at an early date. In this relation, particular attention is directed to the waste of labor, motive power and cars exhibited in the practice of allowing tie contractors to load and ship ties to distant point when they are needed at or near the point of shipment.

(7) In instances where switch engine service is maintained at a point where there is no coal chute, bins should be erected to receive the contents of coal cars for the switch engine supply as soon as such cars are spotted so that their release may be immediate. It is true that this would necessitate a double handling of the coal, but even so, it would be a saving over the practice of allowing the car to stand idle until its contents were used by the requirements of the engine.

(8) Should it prove impossible to concentrate the direction of all company shipments in one office, departments retaining authority to arrange for and make their own shipments should be impressed with the expediency of close co-operation with the department having control of the major portion of the shipping. Thus, if the bridge and building department makes its own shipments, it should be urged to communicate in due time with the main directing office upon such matter where shipments are made to points at which it has no available labor to unload the materials, so that arrangement may be made to have them unloaded by section men, thus assuring the prompt release of cars.

(9) Placards, posters and circular letters are always effective and may be employed effectively here to urge upon every employee the patriotic duty of his attention to the important work of saving car space on company shipments and thereby releasing more cars to the public service.

HANDLING BRIDGE AND BUILDING MATERIALS

By F. L. BURRELL

Supervisor of Bridges and Buildings, Chicago & North Western, Fremont, Neb.

In handling equipment in the maintenance department, we are constantly coming in contact with the operating department. Some three or four years ago we asked for five flat cars to be assigned to our department, and to be used in the handling of the material for our department only. At that time we were told that it would not be possible to supply them for us and that we would have to take our chances with such equipment as came handy. A short time after that an order was issued for the dismantling of some old stock and box cars, and we asked that the floors be strengthened and the cars used for our

purposes. This resulted in giving us six cars designated as non-commercial flats, which were to be used for handling maintenance of way material. The scheme worked nicely for a long time. The cars were handled promptly, both in loading and unloading, and very little delay was experienced in transporting them. They eliminated much extra train work, as the cars were handled on locals, but the mechanical department saw a chance to use these cars in transporting car wheels and took them over, sending them to all parts of the system, and soon scattering them so that at present we have to take quite a number of cars that could be used in commercial service if the non-commercials were returned to us.

Our plan is to load the cars and send them to the station nearest to the unloading point, have the following local train pick them up and the bridge men unload the materials and rebill the car to the division material yard. Instructions have been given the yard material foreman to see that all cars are loaded to their full capacity, provided the load is not too high or top heavy for proper transportation. Some articles may be loaded on a car and make a load of such height as to make it unsafe to handle.

In the case of iron bridge material, nearly all of it is marked as to length and weight, and it is hardly possible to underload the car. In the matter of timbers, it is up to the supervisor to see that the yard man has such information as will allow him to judge, approximately, what his load will weigh without putting it over the scale. For this purpose a table of weights of the different dimensions and lengths of the timbers used in our work is made up and by counting the number of pieces the total weight is easily estimated.

In order to get the capacity load we take one or more bridges, as the case may be, requiring renewals, and have the material loaded in such manner as to allow the unloading of each bridge, without having to tumble the load about to get at any of the material.

In the matter of repairs, the gang or line foreman is given a schedule of the work to be done and he will either send in a statement of the territory he is to cover and have us make up the loading or he can make up a list of the material that will be a full load.

To insure promptness in the handling of cars we have a list of the cars received each morning and of those unloaded and if any delay is shown we ascertain the reason. If the reason is unsatisfactory we go after the man responsible and straighten him out.

The following forms may be of use to someone:

YARD REPORT

....., 191..

Material Received

Car No.	Shipper	Consignee	Material on Car	Date Recd.	Unloaded

YARD REPORT

....., 191..

Material Forwarded

Car No.	To Whom Shipped	Station	Material on Car

FOLLOW UP

.....191..

Foreman:

The yard foreman at has billed for your use the material asked for by you in your letter of the in car No. No report has been received from you. Please explain delay in reporting this car, and what, if any, cause of delay in unloading it.

Supervisor.

GANG FOREMAN'S REPORT

....., 191..

From Car No.	To Station	Material On Car	Date Recd.	Date Unloaded	Cause of Delay

USING A SUPPLY TRAIN

By S. C. TANNER

Master Carpenter, Baltimore & Ohio, Baltimore, Md.

Conservation of car equipment in the transportation of company material in the maintenance of way department should be handled systematically.

1. In all carload shipments the car should be loaded to full capacity, billed out promptly and the exact destination given so that the transportation department can deliver the car to the exact location where the material is required with the least possible delay, and the agent at destination should advise by wire as soon as the car arrives. (2) Cars should be unloaded and released as soon as they arrive. This should be arranged for by the officer in charge before shipment is made. (3) When large shipments of rails or ties are made, a work train should be ordered to unload and distribute the material as soon as it arrives. The work train engine should be equipped with two good air pumps, when possible, so that a double-ended rail unloader can be used, thus making it possible and advisable to unload two cars at the same time, one at each end of the rail unloader. (4) Single carload shipments, and less-than-carload shipments should be handled by the monthly supply train, and should not be loaded until a day or so before the supply train starts out.

The monthly supply train might well be termed a monthly work train, as it performs all the work that a work train would do in delivering supplies of fuel and material for the maintenance of way department and agents' supplies, and also to gather up all surplus and scrap materials.

On a heavy territory like the Baltimore division of the Baltimore & Ohio the supply train will cover an average of 60 miles per day. The force consists of 10 to 15 local track men in charge of a track supervisor and an assistant storekeeper. The rail unloader is always part of the equipment of this train. A regular route is established for this train so that the materials may be loaded in consecutive order; that is, the car may contain a number of shipments, and the first shipment from the starting point of the supply train should be the last loaded on the car, so it will be first off. In this way one car will take many shipments in one load. Bridge and building materials are also shipped on the supply train, and so marked that the proper amount will be unloaded at stations, or between stations, as the case may be, and at the exact location needed. Requisitions for such materials are made and specify the exact destination by referring to the bridge number and mile post, so that the assistant storekeeper with the supply train can arrange for the train to stop at the proper place to unload the supplies. Surplus materials are also collected by the supply train and moved to other places where they are most needed.

By the use of a monthly supply train, the number of cars used is reduced to the minimum. This method insures quick loading and unloading. It also insures loading to full capacity, thus reducing the use of cars to the least possible number.

In many cases the conservation of cars can be accomplished by purchasing materials locally, such as ties to be delivered along the right of way, lumber for buildings

from local mills, aggregates for concrete from local quarries or sand and gravel beds, and brick and many other materials from local markets where they can be delivered on the ground where they are to be used. Some small

difference may exist in first cost, but a large saving will occur in car equipment and the handling of such materials which will more than justify the small additional first cost of the materials themselves.

Testing a Pipe Line by Air Pressure

BY E. L. SINCLAIR,

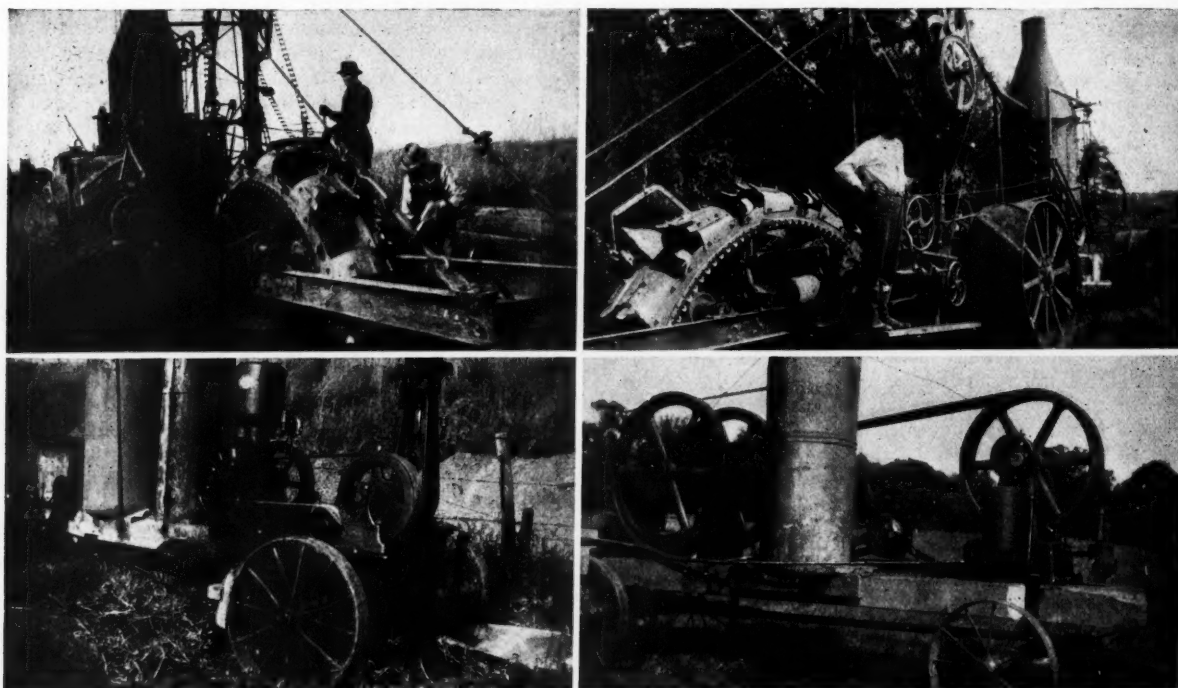
Assistant Engineer, Chicago, Milwaukee & St. Paul, Marion, Iowa

IN CONSTRUCTING a new engine terminal last season, about five miles of 12-in. water supply main was laid under conditions which made it desirable to test the pipe in sections so the trench could be back-filled. A part of the pipe line was to be placed in a public highway, where the permit limited the length of trench that could be opened at one time, making it necessary to plug the pipe and test two or three times between valves. It was decided to make the necessary test with air in place of water on account of our inability to control the water

during operation. At each sag a valve and blow-off branch with a 4-in. hose connection is provided, so that sediment can be washed out, if any collects.

The sharpest curve has a radius of 359.3 ft., corresponding to a change in direction of $4\frac{3}{4}$ in. in a 12-ft. length of pipe. No curved pipe or elbows are used except at the tank. The pipe is laid to an established grade line, the maximum change in grade being limited to 4 in. in a 12-ft. length.

A steam-driven trench machine, cutting a trench 24



ABOVE—TWO VIEWS OF THE TRENCH MACHINE. BELOW—THE AIR COMPRESSING PLANTS

when the plug was removed, where tests were made between valves.

This water main extends from the pump house at the Cedar river to a new engine terminal at Atkins, Iowa, and is installed to furnish water supply for an engine terminal. The water from the river will flow into the intake pit at the pump house through an 18-in. pipe. The suction lift will be 15 ft. at extreme low water and the lift from the pump to the overflow of the tank will be 164 ft., equal to 70 lb. pressure at the pump. It was therefore decided to test the pipe joints with a pressure of 100 lb.

An automatic air relief valve enclosed in a manhole is provided at each summit to permit the air to escape from the pipe when the water is turned on and also to permit any air to escape that collects at the high point

in. wide, was used, the back filling being done by means of a scraper handled by two men and pulled forward by a gasoline engine on a small truck. A pneumatic calker was also used, air being furnished by a gasoline-driven air compressor mounted on a truck.

The pipe-laying force consisted of 1 foreman, 1 machine runner, 1 calker, 1 yarer, 2 pipemen, 2 leadmen and 3 laborers. This force would dig the trench, lay and calk 300 to 500 lin. ft. of pipe per day when the trench was 6 to 7 ft. deep.

The equipment used for testing was a 10 hp. gasoline engine and air compressor mounted on a low-wheel farm truck, on which we placed second-hand 8-in by 16-in. stringers, to which the engine and air compressor were anchored. As the drive pulley on the engine was outside of the flywheel and the transmission pulley on the air

compressor was in the center, it was necessary to skew them on the wagon bed so that each would be placed in the center of the bed. The air compressor was connected to the main by means of a 1½-in. pipe, connected to a tap in a cap over the end of the main, held in place with a lead joint. An air relief valve, set to pop at 125 lb., a gage, a globe valve and a check valve were placed in the line between the air compressor and main.

The first section tested was about 1,500 ft. in length. When the air had been pumped up to 100 lb., the joints were tested for leaks by brushing the joints with a paint brush dipped in a solution of soft soap and water. When there were leaks the escaping air would cause the soapy water to show in foam or bubbles, according to the amount of air escaping.

We found it impossible to recalk the joints so that enough air would not escape to cause a very slight

foam to show at some of the joints, so we decided to fill the pipe line with water and raise the pressure with the air compressor. On inspecting the joints after filling the main with water and raising the pressure to 100 lb. with the air compressor, it was found that of 33 joints that showed air leaks only three showed water leaks, and these only enough to wet the pipe, but not enough to drip. These joints were recalked and the pressure was then raised to 109 lb. and left on for 24 hours, when the gage showed 105 lb., or a loss of only 4 lb. As a result of this experiment we were satisfied that joints that leak only air enough to cause a light foam after soapy water is applied are not apt to leak water, while joints that leak enough air to cause bubbles may leak water and should be recalked.

The pipe was laid by contract and the testing was done by railway forces.

Should Work Be Done by Section or Extra Gangs?

THE RELATIVE MERITS of section and extra gangs on much of the routine work of track maintenance has been the subject of spirited discussion for years. However, the shortage of track labor which prevailed last year in many localities frequently made it difficult to maintain even a semblance of a gang organization. This condition has changed many of the precedents which have been established relative to the handling of track work. Because of this fact we publish below three discussions of the relative merits of section and floating gangs for track work, based on present day conditions.

SECTION FORCES DO BETTER WORK

By JAS. SWEENEY

Supervisor, Chicago & Eastern Illinois, Danville, Ill.

There is ever present the danger that the discussion of any question involving the economical employment of track labor at this time may develop into what Mr. Dooley styled a "matter of argument."

To be efficient, an extra gang must be made up of men who stay in the gang long enough to fit into such an organization as the foreman may be able to effect. We have come to regard the extra gang laborer as being a shade better than the section man, while the extra gang foreman has been chosen from the ranks of the section foreman because of his fitness to handle a larger force of men. Our foremen are no doubt of as high a class now as in the past, but our extra gang laborer has now fallen below the level of the section men.

Section labor is slow, always has been slow, and always will be slow; this is true both of foreman and men. Their work is never ending, yet ever changing. It is a tinker's job and the men become tinkers in the sense that they follow along behind the traffic, patching here and there as defects appear. When any great volume of work is to be performed these same men do not have the necessary vision to see the bigness of the work and put a zest into the carrying forward of the greater task.

It appears to me that the work train draws the line between the two classes of work. A work train is a heavy expense in itself and to get the full value from the expenditure enough labor must be employed to get adequate service from the equipment. We would scarcely expect even a large section gang to furnish enough labor to fully employ a train while ditching or applying ballast

where the ballast is being unloaded by the same gang that is applying it. Handling rail has become even more the work of an extra gang, as the weight of the rail has increased.

Unloading and applying ties seem to be the work of the section gang for two very good reasons: (1) the foreman is well acquainted with the needs of his own tracks and can distribute the ties to the best advantage, and (2) he will be more careful to put the ties in the track in such condition as to give him the least trouble the following season. He will be compelled to live with those ties for about ten years and you can depend on a good foreman putting in ties on his own track so they will stay put if it is humanly possible to do so. The men also get the same spirit and are better men on their own section than they are even when only doing a neighborly turn on an adjoining section.

There is a middle course that I was fortunate enough to follow just once in my life and that was the employment of 25 Italians in what we called an extra section gang. The men had an outfit of camp cars and were sent to a section foreman for a sufficient period to enable him to get his own track up. While working these extra men he was classed as an extra gang foreman and one of the men in the section gang was advanced to foreman of the section. As soon as the work was caught up on that section the foreman resumed his position as foreman on his own section and the gang was moved to another location and placed in charge of another foreman. The objection naturally arises that a change of foremen is a bad thing for any gang, but I found this to be but a slight disadvantage compared to the fine results obtained by having a foreman in charge of the work who knew every foot of the track on which he was working and who also knew that his work for coming months and perhaps years would be easier in proportion to the thoroughness with which he performed it at that time.

The exact knowledge which the foreman has of his own track cannot be overestimated if he is a good foreman. I recall a striking case illustrating this. One foreman had experienced no end of annoyance on account of a soft place. He ordered two cars of brick bats and started digging out at the edge of the ties and making cross drains. He had worked at this place for some time when the roadmaster came along and expressed the opinion that he was spending a greater amount of money there than circumstances would seem to warrant. The

foreman's reply was that those two cars of brick bats would cost only a fraction of what he had spent on this spot before without any real benefit. Had an extra gang been working over that territory the foreman could not possibly have known of the condition below the surface and would not have been able to meet those hidden conditions.

Where we deal with a problem of men we must take into consideration the purely human equation and the decision as to whether or not we will have an extra gang go on a section to do certain work will largely depend on the class of man already there as a foreman. If he is a good foreman and competent to run an extra gang himself it is little less than an insult to run in another foreman and men to do any work on his section other than laying rail, but if he is a weak foreman and not competent to handle a large force of men, let him tinker along and call in the extra gang to do the real improvement work necessary.

What I said in the first paragraph still holds good. Right now it is largely a matter of argument, for we have neither men for large section forces or for the nomadic extra gang and we should not forget the recipe for rabbit pie, which reads: "First catch your rabbit."

EXTRA GANGS INCREASE OUTPUT

By J. W. McNANAMA

Track Supervisor, Boston & Maine, Waltham, Mass.

The use of extra gangs for the heavier section work, such as ballasting, ditching and the renewal of ties, is essential in my opinion. Ordinary section crews are not large enough to handle this work expeditiously, or without seriously interfering with their usual work. It is far better to keep them at their job of surfacing and making general repairs. On tie renewals of considerable extent it is better to have an extra gang do the work, followed by the section crew to do all necessary surfacing and cleaning up.

I find it possible to get plenty of men for my extra gangs and to keep them by exercising some care. About 60 or 70 per cent of my entire force is in extra gangs. We run our boarding cars as well as possible, lay out the work to keep the men employed as continuously as possible and are enabled to keep down the size of our stationary section forces. In our part of the country, it is next to impossible to keep a section crew of any size in a town or city, where there are countless jobs at much higher wages, as the men will leave at any time for the money. Therefore, we find it best to keep a minimum number of men on each section, and supplement their work with floating gangs.

The coming of extra gangs creates a beneficial rivalry in speeding up the section work, and tends to relieve the monotony. Men in these crews, if well cared for, seem to like the idea of working at various points along the line, and fall into the habit of working fast while they are on the job.

With the scarcity of track labor now existing, I should like to see the idea of using "flying squadrons" of picked men carried out for this heavier track work. If conditions more elastic than usual could be permitted, a crew of such men could be organized, moved over the line during the spring and early summer getting things in good shape, and then released for four or five weeks to enable the men to work for the farmers harvesting or on such jobs as would pay them more money for a short time. Then in the autumn the same men should be assured of their railroad jobs and track work could be picked up in good shape.

EXTRA GANGS FOR RAIL AND BALLAST WORK ONLY

By T. HICKEY

Inspector of Maintenance, Michigan Central, Detroit, Mich.

From the standpoint of safety as well as of economy the heavier work of track maintenance can best be done by section gangs instead of by floating or extra gangs. However, the correct solution of this question depends very largely on existing conditions, such as the scarcity of labor for either section or extra gangs. Extra gang men in general are paid higher wages than section men, although I find that section men will do better work and more of it. If conditions were such that our section gangs could have their full complement of men the greatest efficiency would be obtained, for a great deal of the work that extra gangs are now called upon to do would be done by the section gangs at less cost.

The problem is to determine what can best be done to secure section laborers, the majority of which are foreigners. The most important step which can be taken in this direction is to provide comfortable, sanitary quarters for the men to live in.

The work of ballasting, including the accompanying tie renewals, can best be done by extra-gangs. The relaying of rail, including the spacing and renewal of ties, should also be done by extra gangs. It is important that the work of spacing and renewing ties be done as soon as possible after rail is laid. The track should be surfaced and all work completed at the same time.

Unless some unusual conditions are brought to bear or some special work has to be done, section gangs can and will do all track maintenance work other than ballasting and the renewal of rail with savings and will leave the work in better condition if they have the men.



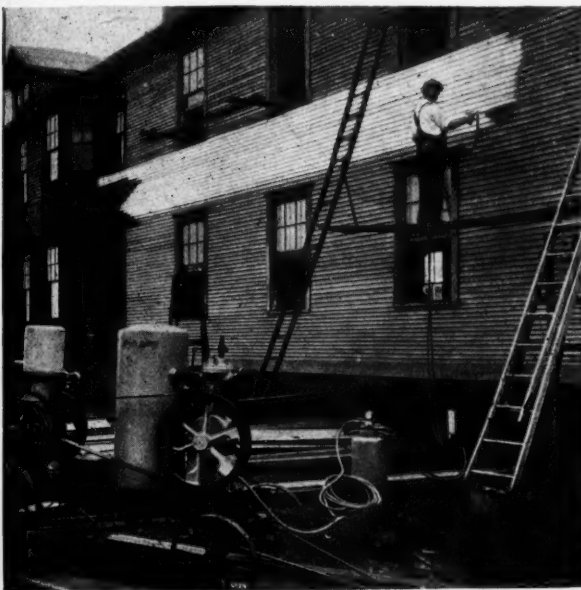
Copyright by Underwood & Underwood, New York

BRITISH TOMMIES DIGGING A CUT FOR A RAILROAD CLOSE BEHIND THE LINES

APPLYING PAINT WITH COMPRESSED AIR

THE CURRENT HIGH COST and scarcity of labor lends interest to a system for the application of paint by means of a spray, a process which is by no means new, but which has only been developed to a high degree of success within recent years, through the perfection of the complete equipment utilized in this work. This process, which is known as the Aeron system of the De Vilbiss Manufacturing Company, Toledo, O., is said to have been applied successfully to a large variety of purposes, from the painting of building exteriors of large area to the coating of small machine parts on specially built tables in ventilated steel booths.

Compressed air is the medium through which the coating is transmitted to and spread over the surface, the important agent being a nozzle for aerating or atomizing the paints or other coating fluids. These nozzles are



SPRAYING PAINT ON A STATION BUILDING

made in a variety of designs adapted to the different classes of service. Thus one type will provide a wide, flat spray, while another gives forth a fine, thin stream. The regular equipment consists of fluid tanks to hold an adequate supply of the coating material, an air compressor operated either by a gas engine or electric motor, and an air receiver, with sufficient rubber hose through which the compressed air and fluid are transmitted to the nozzle. The equipment for outside work such as the painting of buildings or bridges is shown in the accompanying photograph. A gas-engine-operated air compressor and a receiver are mounted on a four-wheeled truck to afford ready portability; but with 50 ft. of air hose between the air receiver and the fluid tank and 25 ft. each of air and fluid hose between the tank and the nozzle, it is possible to conduct the painting operations over a considerable distance without disturbing the compressor. For this class of work the nozzle is provided with a spray head which produces only a wide flat spray, which can be turned in a horizontal or vertical or any intermediate position while in operation to enable the operator to obtain instantly the best position for his work.

This equipment has been used to paint railroad station

buildings and cars and is said to cover the surface at least five times as fast as is possible by hand brushing. It is stated that as much as 2,000 sq. ft. can be covered in an hour. It is not wasteful in the material and with a little experience an operator can apply an unbroken uniform coat.

LARGE EXPENDITURES APPROVED

ON SATURDAY, MAY 18, the railway administration announced the list of budgets which had been approved by the Division of Capital Expenditures. This list aggregated \$937,961,318, of which \$440,071,000 is for additions and betterments, \$479,686,000 is for equipment and \$18,203,000 is for extensions. It was also stated that the railroad administration had eliminated items in the budgets submitted by the railroads amounting to \$349,247,000. The prime consideration governing in the determination of those items which should be approved was the bearing of the proposed improvements on the effectiveness of the railroads as a war utility. This accounts for the fact that extensions amounted to such a small figure and that items for passenger stations were largely eliminated or materially curtailed.

Among the more important projects approved on the individual roads with the amounts authorized for this year are the following:

Erie: Grade reduction and second track, Steamburg to Falconer, 14 miles, \$510,000; grade reduction and grade separation, Union City, Pa., \$351,000; second track, Sharon, Pa., to Middlesex, 8 miles, \$375,000; car dumper, Buffalo, \$406,000.

C. N. O. & T. P.: Second track, near Lexington, Ky., \$2,300,000 (total cost \$3,960,000); terminal yard, Danville, Ky., \$900,000.

C. C. C. & St. L.: Second track, Indianapolis division, \$2,000,000 (total cost \$4,762,000); second track, Chicago division, \$1,658,000; second track, Columbus, Ohio, \$475,000; new yard at Sharonville, Ohio, \$500,000.

Grand Trunk: \$1,640,000 for yard improvements, including new classification yard at Port Huron, Mich., \$400,000; Nichols, \$203,000, and Thornton Junction, Ill., \$450,000.

New York Central: Four-track entrance into Syracuse, N. Y., yard, \$340,000; new yard at Depew, N. Y., \$484,000; change of grade and line at Tonawanda, N. Y., \$1,442,500.

Lehigh Valley: Classification yard at East Waverly, N. Y., \$350,000 (total cost \$2,000,000); ocean terminal at Greenville, N. J., \$200,000 (total cost \$15,000,000).

Norfolk & Western: Roanoke, Va., yard, \$879,000; the Hagerstown, Md., yard, \$590,000; the Bristol, Tenn., yard, \$565,000.

Hocking Valley: Second track between Delaware, Ohio, and Cummings, 27.9 miles, \$1,260,000.

The following data gives in some detail the budgets approved for almost all of those railways for which the total appropriations for additions and betterments for 1918 exceeds \$1,000,000:

EXPEDITING AUTHORIZED WORK

In an endeavor to expedite the additions and betterment work which has been authorized, the Director General issued Circular No. 25 as follows under date of May 8:

"Each carrier shall at once make a report in duplicate, sending one original to the Director of the Division of Capital Expenditures and the other original to the Regional Director, giving full advice as to whether the carrier is proceeding with all practicable expedition to construct and put into operation all additions and betterments on its lines which may have been approved by the Director of the Division of Capital Expenditures, and all equipment which may have been so approved and which the carrier may be constructing in its own shops.

"If a carrier shall not have commenced any project so

DISTRIBUTION OF ADDITIONS AND BETTERMENTS APPROPRIATIONS.

Road	Ballasting	Rails and other track material	Bridges, trestles and culverts	Additional main track	Additional yard tracks, sidings, etc.	Signals and interlocking plants	Road machinery and tools	Frt. and Pass. stations, etc.	Fuel stations etc.	Water stations and appliances	Shop buildings, engine-houses, etc.	Shop machinery and tools	Electric Power plants	Wharves, grain elevators, storage warehouses, etc.	A and B chargeable to operating expenses	Improvements to existing equipment	Total Additions and Betterments	
A.G.S.		\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	
A.C.L.	1,889,500	230,000		555,000	73,000	5,000	1,000	382,928	50,100	30,000	4,000	4,000			7,173	1,062,092	1,062,092	
B. & O.	105,000	2,684,931	2,367,736	1,968,864	3,211,226	34,500	15,400	185,212	70,331	163,864	101,648	645,270			1,248,613	2,823,959	2,823,959	
B. & A.	1,095,600	648,100		60,000	750,000	69,400		815,900		47,900	5,981,930				4,093,858	1,626,373	16,022,171	
B. & M.	2,692,314	3,175,487		1,086,000	1,838,985	263,893		330,113	77,197	52,080	47,900				1,095,600	2,199,400	2,199,400	
B.R. & P.	105,918	154,687		46,237	294,557	130,464	2,500	22,856		11,225	3,407,221	22,914	\$278,382	1,812	4,525,265	2,633,692	8,948,648	
C. of Ga.	273,586	915,969			178,091	82,675		19,164	35,760	34,497	143,599	197,960			229,543	313,649	1,738,047	
C. & O.	540,000	1,311,501		769,963	1,701,249	212,220	33,667	454,798	248,781	346,159	780,513	368,050	86,898	73,963	697,642	167,000	1,514,678	
C. & A.	148,350	547,600			247,774					25,000	185,000				1,255,539	7,028,094	7,028,094	
C. & E.I.	180,000	480,000		217,800	1,143,723			4,500			181,367				518,585	1,060,542	1,060,542	
C. & N.W.	661,558	2,870,840		377,890	283,860	399,000	34,342	31,711	162,246	295,034	1,119,063	199,136		657,805	542,105	2,185,488		
C.B. & D.	406,597	1,445,212		584,227	1,616,117	264,256		222,216	128,685	344,334	1,969,370	448,200		70,272	2,280,826	550,878	7,570,932	
C.M. & St. P.	317,415	2,048,400		317,000	1,511,631	61,917	167,562	369,157		577,500	945,627	354,266		58,064	2,692,206	1,230,184	6,246,638	
C.R.I. & P.	602,322	2,451,780		1,013,471	1,397,000	55,000	4,000			32,000	30,000	6,500			3,280,387	1,810,475	8,248,605	
C.N. & T.P.	50,000	140,000		3,960,000	1,040,000	55,000									146,362	5,415,994	5,415,994	
C.C. & St. L.	425,000			4,409,874	2,832,318	68,700	21,877	111,024		117,747	710,419	70,750			835,977	996,838	10,117,796	
C.V.	158,740				4,808	4,598	450	55,200			1,111	742			129,442		1,280,961	
D. & H.	271,156	87,588		388,052	232,700	7,784	9,530	132,996	26,991	16,996	90,307	30,304	25,628		230,442		1,280,961	
D.I. & W.	520,013				41,732			148,219		37,557	308,102	24,775	153,901	91,000	814,527	1,196,659	1,196,659	
D.M. & N.	66,790				402,471			32,554		7,954	186,155			1,349,390	58,787	10,500	2,120,218	
Erie	531,788				1,089,420	180,414	46,932	914,633	518,192	114,081	2,382,156	128,314		666,000	1,175,839	20,391	9,799,262	
G.T.	5,000	2,191,908		59,410	1,648,105	335,665		252,796	22,500	49,599	1,058,609	128,314			1,859,370	20,391	9,799,262	
G.H. & S.A.	90,556	917,770		357,891	81,377	9,500		33,451	71,901	140,464					823,661	66,305		
H.V.	127,000	389,520		1,283,027	1,009,601			9,701	345,927		490,296	106,756			193,000	351,522	3,622,043	
I.C.	121,600	774,540		141,750	1,402,580			622,520		401,120	2,345,170	537,932			2,303,655	1,471,823	10,660,551	
K.C.S.	237,338	263,297		388,343	207,947			135,676	3,020	7,212	17,420	97,347			451,698	1,204,279	1,204,279	
K.C. Term.				189,000	1,000	29,100		53,600		15,000	800,500	20,200			41,130	41,300		
L.E. & W.	10,000	72,000			43,500	10,000		45,000	15,000	31,000	800,500	20,200			73,200	73,400	1,133,600	
L.V.	722,602	628,364		454,000	939,353	290,548		327,275	88,760	157,781	2,514,114	230,538	103,140	27,665	1,672,588	669,472	5,773,247	
Long Is.	217,084			334,660	125,165		3,186	110,738	17,000	22,756	92,449	57,753	2,363	1,600	153,311	137,252	1,193,990	
Mahoning Coal.	91,000			11,000	130,625			475		28,100	787,400				3,300	27,322,000	443,035	1,301,275
M.C.	478,850	2,800,000			283,280	53,142		304,475	126,000	130,800	2,231,800	192,098			2,732,200	443,035	4,426,225	
M.St. P. & S.S.M.	150,000	227,112			211,005			136,857		29,000	110,650	33,675			416,752	186,770	1,141,166	
N.C. & St. L.	432,000	7,908,678		1,324,385	27,064	2,079,123	134,400	1,617,100	251,000	438,068	357,363	56,000			317,098	151,067	1,272,338	
N.Y.C.																		
N.Y.N.H. & H.	87,450	1,689,942		1,493,930	6,150,500	2,079,123	134,400	1,617,100	251,000	438,068	357,363	56,000			317,098	151,067	1,272,338	
N. & W.	852,876	388,893		487,190	6,816,870	1,098,336	13,435	296,065	181,240	22,593	7,707,560	651,800	2,238,025	59,450	10,239,939	6,235,237	32,428,693	
N.P.	1,079,000	1,320,099		20,000	4,428,948	118,190	1,250	131,175	55,840	25,527	1,486,389	469,974	952,420	480,871	5,092,549	1,793,036	14,713,919	
P.L.W.	570,400	6,215,200		3,495,500	499,091	507,059		112,518	22,000	48,161	950,000	120,000			1,007,270	1,261,301	8,888,167	
P.R.R.	602,016	10,738,269		8,602,016	7,540,420	124,864	26,186	842,483	169,080	107,281	7,464,754	459,960	5,500	11,800	2,034,945	1,116,170	5,140,123	
S.P.	351,994	1,192,654		865,938	16,107,450	686,702	95,203	2,029,591	236,378		3,780,466	1,250,000			9,515,693	1,187,102	27,966,754	
St. L.-S.F.	306,804	2,918,345		247,306	2,482,122	171,616	4,400	224,658	107,506	438,956	699,150	207,141	7,530	3,532	1,644,697	1,139,944	5,709,397	
Y. & M.V.	1,010,446	740,988		356,000	1,300,420	45,482		320,030	54,635	717,671	608,964	37,771	55,205	3,844,115	754,823	507,762	7,081,671	
O.S.L.	686,166	300,838		420,420	58,600	133,450		130,000		81,545	175,471	43,020			1,488,113	109,459	1,422,756	
G.N.	500,000	1,274,000		1,517,000	1,809,000	450,000	5,045	160,000		200,000	539,000	186,571			1,488,113	109,459	1,422,756	
G.C. & S.F.	296,465	537,036		535,395	516,978	25,301		125,745	213,982		109,923	17,106			293,746	6,855	2,469,408	

approved, or, having commenced it, shall not be prosecuting it vigorously to completion, the carrier shall specify in the above mentioned report each such project and state fully the reasons why it has not been commenced or why, if commenced, it is not being vigorously prosecuted to completion.

"If a carrier shall not have, on hand or arranged for,

the necessary funds to construct and put into operation without delay all the additions and betterments which have been so approved, and if it anticipates that this condition is likely to delay any of such work, the carrier shall in addition make a report at once to the Director of the Division of Finance, stating its financial needs in order to complete all such work expeditiously.

The Making and Delivery of Ties*

BY NELSON C. BROWN,

THE HEWING OF TIES is done either by owners of small holdings or by contractors who buy stumpage by the acre or still more commonly by the tie. Throughout the country the work is usually done between October 1 and April 1, both because many of the railroads require in their specifications that the timber be cut during that period and because other work is less active in the fall and winter.

As is the case in all timber values expressed as stumpage, the value of ties in the tree varies with their kind and quality, their accessibility, and the difficulty of logging and transportation to market. In the prominent tie producing sections of Kentucky and West Virginia, well located white oak stumpage involving a haul of from one to six miles is worth from 10 to 20 cents per tie, many sales having recently been made for about 16 cents. Southern yellow pine stumpage is worth from 6 to 14 cents, with an average of about 10 cents. Douglas fir and western larch stumpage brings from 4 to 10 cents per tie; western pine from 4 to 8 cents per tie, red oak and chestnut from 8 to 15 cents per tie, depending upon the quality and location. Hardwood ties, such as beech, birch, maple, elm and red gum, are worth from 5 to 12 cents a piece on the stump.

SUITABLE SIZED TIMBER FOR HEWING

The best sized trees from which ties are made by hewing are those from 11 to 15 in. in diameter at breast height, although trees from 10 to 17 in. are customarily taken. Lodgepole pine as it grows throughout the northern Rocky mountains is naturally most suitable in size for hewing into ties, since most of the merchantable stands of this timber contain from 75 to 200 trees per acre, 10 to 16 in. in diameter.

In investigating the average number of ties that can be cut from trees of different diameters, Zon has prepared the following table† as a result of measuring 996 loblolly pine and hardwood ties in eastern Texas:

Diameter, breast high	Number of trees measured	Average number of ties cut from each diameter
11	77	2.4
12	236	3.1
13	257	3.9
14	231	4.8
15	140	5.2
16	53	5.7
17	2	6.0

In western yellow pine suitable for hewing into ties in the Southwest the average number of ties per tree is only 2.7, but here the trees do not grow to a very great height. Tie hackers do not like trees of too small diameter because an insufficient number of No. 1 ties can be cut from them for the labor involved in felling, limbing,

etc., whereas in trees of 16 in. or over in diameter the hewing is more difficult and the ties are difficult to handle on account of their large size.

The following table is interesting in that it shows the minimum diameter of logs from which the various sized pole ties may be hewed together with the cubic feet contained in the pole tie that conforms to the exact specifications. They are given for some of the larger railroad systems. A tie length of eight feet is used for all.

Railroad	Hewed Face inches	Pole Ties Thickness inches	Minimum diameter of log in inches	Cubic feet in tie
C. B. & Q.	7.5	6.5	10	3.34
U. P.	6.5	7	9.6	3.38
G. N.	7	7	9.9	3.48
N. P.	8	7	10.6	3.73
A. T. & S. F.	8	7	10.6	3.73
C. M. & St. P.	8	7	10.6	3.73
O. S. L.	8½	7	11	3.97
C. & N. W.	6.7	6	9	2.76

It is customary to use the converting factor of 30 ties per 1000 ft. b. m. for the average standard pole tie, cut eight feet long. This means, therefore, that the average tie contains 33⅓ ft. b. m. It is apparent from the above that this factor is a variable one.

The cost of hewing depends upon the ability and efficiency of the hacker or tie chopper; the species and whether green or dead; the condition and slope of the ground; the run of timber, such as adaptable sizes, shape, height of bole, freedom from limbs and defects, and amount per acre, etc.; and the specifications for the ties.

Contracts for hewing No. 1 ties range from 14 or 15 cents for difficult conditions, down to 10 cents for good "chances" and from 8 to 11 cents for "seconds." The usual prices paid in Pennsylvania are 11 cents for chestnut, 13 cents for oak "firsts," and 8 and 10 cents respectively for "seconds." In the west 14 cents is a customary price for hewing "firsts" and 9 cents for "seconds." Tie hacks bend every effort to make all the "firsts" possible from every tree handled, as it is current opinion among them that there is no money in making "seconds." Hewing No. 1 ties in West Virginia and Kentucky costs from 13 to 15 cents per tie. On a tie operation in northern New Mexico when the timber ran about three ties per tree, each man turned out about 20 ties on an average per day. In a 10-hour day the time was divided as follows: 1¼ hours felling, 3½ hours limbing and scoring, 3 hours facing, 1 hour bucking into lengths and 1¼ hours peeling. On this basis the average cost of hewing was distributed as follows:

Operation	Cost per tie
Felling	\$.011
Scoring	.032
Facing	.027
Bucking	.009
Peeling	.011

\$.090

*Copyright, 1918, by Nelson C. Brown.

†See Loblolly Pine, Eastern Texas, by R. Zon, Forest Service Bulletin No. 64, 1905, p. 36.

TRANSPORTATION

Skidding usually costs from 2 to 3 cents per tie. It is done by hand for short distances, but is more frequently done by a single horse or team taking from 2 to 6 ties per trip. On one operation where over 3,000 ties were taken by hand to the haul road, an average distance of $\frac{1}{4}$ mile, each man handled an average of 136 ties per day, and the cost was 3 cents. Go-devils are sometimes used, especially on the longer skidding chances. One man can skid from 150 to 200 ties with one horse a distance of $\frac{1}{8}$ mile in the average day.

Hauling from the banking grounds to the railroad or stream is by means of a wagon or sled. Winter hauling on snow with sleds is of course the cheapest. On an iced sleigh-haul road from 60 to 100 ties are commonly moved in a load. From 40 to 60 ties may be hauled on a wagon under the most favorable conditions, but under ordinary circumstances from 20 to 35 ties are considered a good load.

The cheapest method of transportation is driving, but good, drivable streams are seldom available on tie operations. Ties can be driven cheaper than other forms of material because of their short length and small size compared to saw logs, poles, long timbers, etc. Driving can only be practiced in the spring, so that an interest charge of from 6 to 8 per cent must be added to the cost together with an allowance for loss. The cost of driving is very variable. The cost of putting ties in the stream, taking them out and piling them costs about 2 cents apiece. Two men and 1 horse can take out and pile 600 ties per day. In one drive of about 90 miles, involving 300,000 ties, in the west, the cost per tie was $5\frac{1}{2}$ cents. Fluming and chuting are practiced to a limited extent on some of the larger operations in the west, particularly with lodgepole pine and Douglas fir, as well as with western yellow pine.

On some of our navigable streams ties are fastened together in large rafts or they are loaded on large barges and towed to destination. The average barge on the Mississippi river or its tributaries holds between 7,000 and 8,000 ties. In loading the cars from a barge or raft, a tie hoist is used. This usually consists of a cradle lowered and raised on an incline track extending from the water to the loading platform by means of a gasoline engine. Before they are loaded on the cars from the ranks or cribs, they are inspected and branded by a railroad tie inspector and are spotted with paint.

Generally speaking it costs more to deliver sawed ties on the market than hewed ties. In the central hardwood region, it is commonly understood that it costs about 5 cents per tie more to deliver sawed white oak ties on that market than hewed ties, with the same given conditions of timber, accessibility, specifications, etc. In this region the cost of sawing ties on four sides is 10 cents for 7-in. by 8-in. by 8 $\frac{1}{2}$ -ft. ties, and 8 cents for 6-in. by 8-in. by 8-ft. ties. Felling and logging of timber to the sawmill is about 12 cents per tie for the first named size and 10 cents for the latter size. The added cost of sawed ties over hewed ties is due usually to the increased logging expense of hauling the log and waste slabs to the mill. In hewing, the tie is made on the ground, skidded to the hauled road and then brought directly to the railroad.

SUMMARY OF OPERATING COSTS*

The following table, supplied by W. F. Goltra, shows the usual costs involved in and prices received for white oak and other hardwood ties based upon a number of operations in Kentucky, the center of the oak producing

region. The specifications used are an 8-in. face, a 7-in. thickness and an 8 $\frac{1}{2}$ -ft. length. The seconds or No. 2 ties were those which failed to pass inspection as No. 1 ties.

	White and Chestnut Oak		Red Oak		Beech	
	1sts	2nds	1sts	2nds	1sts	2nds
Stumpage	\$0.20	\$0.12	\$0.12	\$0.10	\$0.10	\$0.08
Felling and hewing..	.15	.10	.12	.08	.12	.08
Hauling to railroad, av. 10 miles.....	.15	.10	.15	.12	.15	.12
Loading on cars.....	.02	.02	.02	.02	.02	.02
Totals .....	.52	.32	.41	.32	.39	.30
Prices received ...	.60	.40	.47	.37	.42	.32
Profit	\$0.08	\$0.08	\$0.06	\$0.05	\$0.03	\$0.02

The following data were supplied by the United States Forest Service from a tie chance on the Tongue river within the Bighorn National Forest in Wyoming where 1,555,000 standard gage hewed and sawed ties were taken out on a flume operation. Most of the timber was lodgepole pine and a very limited amount of Engelmann spruce. Most of the ties were hewed.

	Hewed ties	Sawed ties
Felling, bucking, limbing and hewing (for hewed ties)	\$0.122	\$0.031
Skidding .....	.050	.031
Hauling to flume, including cost of temporary roads .....	.040	.056
Brush disposal and cutting defective trees..	.030	.024
Fluming or driving to mill.....		.016
Sawing .....		.055
Fluming 27 miles, driving to railroad and handling in yard.....	.035	.035
Depreciation of improvements and equipment .....	.047	.065
Maintenance of improvements and equipment .....	.010	.013
General and miscellaneous expenses.....	.017	.022
Totals	\$0.351	\$0.348

On an operation in the Northwest where 22,000 Douglas fir, western larch and a few lodgepole pine ties were cut the following costs were noted. A 160-rod chute was used to get the ties down a steep place followed by a $\frac{1}{2}$ -mile wagon haul where 2 trips per day were taken and frequently loads of 50 to 60 ties handled per load. Skidding for a distance of $\frac{1}{8}$ to $\frac{1}{4}$ mile was done by hand.

	Cost per tie Firsts	Cost per tie Seconds
Stumpage	\$0.06	\$0.06
Cutting .....	.14	.09
Skidding .....	.03	.03
Piling brush .....	.02	.02
Piling at chute.....	.01	.01
Chute and chuting.....	.01	.01
Hauling .....	.05	.05
Totals	\$0.32	\$0.27

A typical example of the cost of producing sawed ties 7 in. by 8 in. by 8 ft. along the Ohio river is as follows:

	Cost per 1000 ft. b.m.		Cost per tie at 30 ties per 1000 ft. b.m.	
Stumpage	\$6.00—\$10.00		\$0.200—\$0.333	
Felling	1.25— 1.25		.041— .041	
Logging	1.50— 2.00		.050— .067	
Sawing, yarding, etc.....	4.00— 5.00		.133— .167	
Hauling 2-6 miles.....	1.00— 2.50		.033— .083	
Totals	\$13.75—\$20.75		\$0.457—\$0.691	

As noted before, where saw logs run about 10 per 1,000 ft. b. m., about 30 ties 7 in. by 8 in. by 8 ft. can be sawed from each 1,000 ft. b. m.

*All costs are based on 1917 data.

The cost of sawing Douglas fir ties in the northwest was found to be as follows at one mill. Lumber was the main product and only the smaller logs and hearts of larger logs were sawed into ties:

	Cost per 1000 ft. b.m.	Cost per tie at 30 ties per 1000 ft. b.m.
Stumpage	\$2.00	\$0.067
Cutting logs (felling and bucking)....	.60	.020
Skidding	1.25	.041
Hauling to mill.....	2.75	.091
Sawing	2.00	.067
Overhead: Depreciation, interest, taxes, sales expense	1.25	.041
Totals	\$9.85	\$0.327

The following prices will give an idea of the values prevailing for cross ties announced by some of the rail-

roads in their specifications. The Pennsylvania Railroad advertised the following for certain divisions:

Species	Grade 1	Grade 2	Grade 3
White oak, black locust, black walnut and black cherry.....	\$0.75	\$0.65	\$0.35
Chestnut, sassafras, and red mulberry..	.55	.45	.20
Red oaks, honey locust, hickories and beech .....	.50	.40	.20
Hard maples, sycamore, red gum, hack- berry and ashes.....	.45	.35	.15
Soft maples, black gum, butternut, birches and elms.....	.40	.30	.10

The Delaware, Lackawanna & Western paid the following prices in 1917:

Species	Class A	Class B	Class C
White oaks, cherry, mulberry, black lo- cust or black walnut.....	\$0.65	\$0.50	\$0.25
Chestnut .....	.45	.30	not taken

The Importance of Miscellaneous Reports*

BY J. T. BOWSER,

Maintenance of Way Department, Southern Railway, Danville, Ky.

ALL OF THE PREVIOUS ARTICLES of this series have dealt with the clerical work required of foremen in the Maintenance of Way Department, which may be classed strictly as reports. There is, however, much clerical work and correspondence which cannot be classed as reports, but without a discussion of the details of which this series of articles would not be complete. The most important of these duties, at least in the amount of time consumed, is the correspondence. If foremen, supervisors and other field men could be brought to realize the vast amount of time and annoyance that could be saved to themselves as well as to the office and to the officers to whom they report, by prompt, complete and clear replies to correspondence, the operating machinery of the department could be speeded up greatly, and there would be a marked increase in efficiency.

The writer is ready to acknowledge that a great many useless letters are written, but the same condition seems to prevail in nearly every business activity in which men are engaged. There are always a great many useless things done. But if the useless letters are answered promptly along with the useful ones, many more useless tracing or follow-up letters will be avoided. It is best to answer all letters as well as can be done, and leave someone higher up to judge of the necessity of the information asked for. The foreman necessarily has a rather small field of observation and he cannot therefore always judge correctly the necessity of anything that is required of him.

Then when a letter is received let us remember that we are not called upon to judge as to its usefulness. We should read it carefully, understand as nearly as possible what is wanted, and when writing the reply make sure that every question raised is answered fully and clearly. If this is done promptly, and in most cases it can be done by return mail, it is disposed of at once. No exasperating tracers or follow-up letters are received and a favorable impression is made on the office and on the officers to whom the foreman reports. One should always read a reply over when it is completed and compare it with the letter which it is intended to answer, to make sure

that he has covered the ground thoroughly.

Ordinary business correspondence received from superior officers may be classed under four heads: (1) Letters giving information, (2) letters asking for information, (3) letters giving definite orders and instructions, and (4) those giving general instructions and outlining policies or standard practice.

Letters of the first class rarely call for replies, and when they do a simple acknowledgment is sufficient. Those of the second class should be answered as soon as the information can be obtained, and in case the information cannot be secured as soon as it may reasonably be expected, a note setting forth the reasons therefor will save tracers from the office and will reflect favorably on the foreman.

Correspondence coming under the third head should be acknowledged if the instructions contained therein cannot be carried out immediately, and the reasons therefor should be explained in the acknowledgment. Then when the instructions have been carried out report should be made to this effect.

Letters of the last class require an acknowledgment only. One may well ask, "Why require replies at all, except to letters asking for information?" Is not all the other correspondence time wasted? Are we not paid to carry out instructions, and do we not do it? Why all the acknowledgments?" If the majority of men were not afflicted with short memories, if they were not prone to put things off until to-morrow, and if letters were not often lost in the mail, those points would be well taken. But they do forget, they do procrastinate, and letters are often lost or miscarry. Therefore, the office must follow up these orders and see that they are carried out. Acknowledgments must be secured in order that the office may be sure that the instructions are received. A good office man is one who can do this with the minimum amount of letter writing. The officer under whom he works cannot possibly remember and follow up every order that he issues, and the office man, through his open or suspense files, must be the officers' memory. These suspense files, if they are to be of any value, must not be closed until the instructions have been carried out and a report made, or the information is received.

It is not necessary that foremen burden themselves with files of their own, though it does no harm to keep

*Previous articles in this series on Maintenance of Way accounting have appeared in the December, 1917, issue, page 381; the January issue, page 18; the March issue, page 105; the April issue, page 135, and the May issue, page 169.

carbon copies of letters written, but copies of all general instructions should be kept where they will be available for future reference and should be looked over regularly to keep them fresh in mind.

In addition to answering correspondence received, there are certain matters concerning which foremen must originate correspondence. All maintenance of way foremen, and section foremen in particular, are the representatives of the railroad on the territories which they cover in handling their work. They are the local guardians of the property and must protect it in various ways. If possible they must prevent encroachments on or misuse of the property, and failing to prevent this, they must report the facts promptly to the proper officer. They must keep in mind the motto of all railroads, "Safety First," and remedy or report any unsafe condition or practice. They must watch the speed of trains and report instances of excessive speed. In making these reports, all details must be covered carefully and all available information given accurately. A bare report of the conditions or facts will, in 75 per cent of the cases, only serve to bring a letter of inquiry from the office asking for additional information. In addition to saving these extra letters, the effort to see and report all important facts bearing on the matter to be reported on, will, whether realized or not, develop one's powers of observation and sharpen his insight, thus not only improving his work generally, but increasing his fitness for promotion, for these two qualities rank near the top in the qualities required of men in official positions.

After the regular reports and correspondence, the balance of the clerical duties of the foreman is made up of dozens of little details which must be attended to more or less frequently. For instance, reports of the performance of work trains are required in order that someone in authority may see that a proper amount of service is received for the money expended for this purpose. Reports of work train performance should show the amount of work accomplished and the delays sustained. Work trains are too costly to be used inefficiently, and if the maximum amount of service is not secured, the reasons must be known. One can obtain these reasons in no place better than from the man on the ground, the foreman. Dispatchers have been known to delay work trains unnecessarily to avoid a possibility of delay to other traffic, and the foreman's reports of delays serve as a check on this tendency.

Then there are the requisitions for materials. An order carefully made out to show clearly what is wanted and calling for no more than is actually needed, is much more likely to be filled promptly and without question, than is one which has to be studied to ascertain what is wanted, or one which calls for an apparently unnecessary amount of material. Either of the latter is likely to cause more of the unnecessary and highly undesirable correspondence.

Storekeepers' receipts for material, receipts for switch keys, lanterns, rule books, time cards, etc., not only serve to prove delivery, but also tend to increase the care with which these articles are kept and used. The office usually has a record of these receipts and will follow each up until it is signed and returned. Another chance to save correspondence. Sign them and return them promptly.

To sum up the questions covered in the preceding, the best way to keep the clerical work down as nearly as possible to what is absolutely necessary is to do well what is required, and do it promptly. In this manner tons of paper, a great deal of time and much temper will be saved to all concerned.

THE OPEN GATE

By C. E. LINDSAY,

Division Engineer, New York Central, Albany, N. Y.

EVERY MAINTENANCE OF WAY officer has been confronted at one time or other with the problem of the open gate at farm or other private crossings. The laws of most states require railroad companies to build fences on the right of way lines, the ostensible purpose of which is to prevent stock, such as horses, cattle, sheep and hogs, from getting on the tracks. The laws are based upon the idea that such animals are a menace to the safety of trains, and are an exercise of the police powers of the state, placing all the responsibility and expense of such protection upon the several railroad companies.

The laws also require that farm crossings be provided by the railroad company where a railroad is built through a farm for the purpose of affording the farmer convenient means of access to the various portions of his land. These crossings require that gates be built in the right of way fences, but in only a very few states and countries is any means provided to compel the farmer to keep such gates closed when the crossing is not actually being used. The result is that the farmer consults his own convenience entirely, ignoring the obligation of the railway company to maintain the enclosure of its right of way for the safety of the public, and leaves one or both of the gates standing normally open unless perhaps he has stock pastured in the adjacent fields.

Moral suasion has little influence with the large majority of such men. They can see no reason for opening and closing the gates every time they pass through, or of keeping a gate closed when there is no stock in the adjoining field, forgetting that stock may get into that field from an adjoining one or from a public highway. Such selfish disregard of the rights of others or of their own moral or legal obligations exposes the public to grave risk of damage or injury, and nullifies the efforts and expenditures of the railroad company to comply with the laws.

The average farmer has the idea that the fence is built for his sole benefit (although he must share in the cost of building and maintaining the fences between his land and that of his other neighbors), and believes that a beneficent legislature placed the entire cost of building right of way fences upon railroad companies as a fitting punishment for passing through his land. In some countries, as in Canada, the land owner must keep the gate closed and he may be deprived of the crossing or otherwise punished for his failure to do so.

It does seem that in equity the burden of keeping such gates closed should rest upon the person for whose convenience they were built. In an effort to reduce the evil the plan has been used of having a sign on each side of each gate reading:

FOR SAFETY—
PLEASE CLOSE
THIS GATE

It was gratifying to note the response to this mute appeal to the better nature of the farmers in that vicinity. The result, while not a complete compliance with the suggestion, has been very general and has reduced the evil to a minimum. It would appear to be the duty of the law-making bodies to recognize the injustice of the existing situation and supplement the existing laws, placing the responsibility upon the farmers of keeping such gates closed at all times for the safety of the public except when necessarily open.

ACTIVITIES OF THE RAILROAD ADMINISTRATION

Abstracts of the Orders Issued by the Director General and
Regional Directors. The Wage Commission Report

REPRESENTATIVES of the Railroad Administration and the railways are still working on the preparation of contracts covering the use of the railway properties by the government. Each side prepared and submitted a tentative draft of a standard form of contract and these drafts have been the subject of numerous conferences. It is expected that the standard form of contract will be agreed upon soon and this will be used as a basis for the specific agreements between the individual roads and the government.

The Railroad Administration has asked that the expense accounts of railroad officers be itemized more in detail than has sometimes been the case in the past. It is ordered that all expense accounts must be so itemized that the nature of the expenditure can be readily understood. For example, the accounts must indicate the amount paid for a room and separately for meals while transportation must be shown in sufficient detail to indicate the division of expenditures for railroad travel, cab hire, etc.

Arrangements have been made for the consolidation of city ticket offices in a number of cities in the eastern part of the country, each office selling tickets over all of the lines leaving that city. Under the new arrangement there will be five offices in Greater New York and one in Chicago.

The first radical step in the rearrangement of passenger terminals occurred on April 28 when passenger trains of the Baltimore & Ohio were transferred from the station of the General Railroad of New Jersey at Jersey City into the Pennsylvania terminal in New York City. This change was made for the purpose of affording the public greater facilities and utilizing Baltimore & Ohio trains more nearly to capacity, thereby relieving the Pennsylvania to this extent between New York and Washington.

The United States Railroad Administration has placed orders for 100,000 freight cars and 1,025 locomotives, to be built to its standard specifications. The car order includes 50,000 box cars and 50,000 hopper and gondola coal cars, divided between 17 car building companies. The locomotive order was divided, 555 to the American Locomotive Company and 470 to the Baldwin Locomotive Works. The total cost of the cars is placed at from \$250,000,000 to \$300,000,000 and of the locomotives at approximately \$60,000,000. It is understood that 145 additional locomotives are to be awarded to the American Locomotive Company and 30 to the Baldwin Locomotive Works in about 60 days, and that approximately 1,000 additional locomotives and about 100,000 additional cars are to be ordered in about six months.

It is expected that increases in freight and passenger rates will receive the attention of the Director General in the near future. The heavy deficits which have already occurred under government control, if continued at the present rate throughout the year, indicate that the operating income of the roads in 1918 will be insufficient by at least \$500,000,000 to pay the guaranteed compensations without any increases in wages. The proposed wage increase of \$300,000,000 will increase this deficit to \$800,000,000. It has been reported that the government is planning an increase of 25 per cent in freight rates and the raising of passenger fares to three cents.

Director General McAdoo has issued an order placing the management of each road in the hands of an officer to be known as the federal manager, the understanding being that this position will, as far as practicable, be filled by the president or some other officer now on the railroad. However, in case the president is not so appointed, his services will cease in so far as the railroad administration is concerned, and if he is retained by the railroad his salary must of necessity be paid from the guaranteed earnings rather than from the operating expenses. This same order provides for the organization of two new administrative districts known as the "Allegheny Region," including roads extending east from Pittsburgh and Erie to tidewater, and the "Pocahontas Region," which includes the Chesapeake & Ohio, the Norfolk & Western and the Virginian. C. H. Markham, who has been serving as director of the southern regional district, has been appointed director of the Allegheny Region.

CONSERVATION OF MATERIALS

The Western Regional Director has issued instructions regarding the conservation of materials as follows:

The director of the Division of Transportation has issued the following instructions dated May 6, which should be observed in connection with Circular No. R. P. C. 10:

"In view of the increasing difficulty in obtaining a sufficient amount of steel and iron products, it is more important now than ever that every effort be made to reclaim and make repairs to old material instead of using new, and under no circumstances must material be scrapped until:

1. It is known positively that it cannot be satisfactorily repaired.

2. That the cost of repairs will be prohibitive.

"Each road will appoint a 'reclaim committee,' which will make a study of the proposition and put into effect the necessary methods to carry out the desired results and make recommendations for devices or apparatus that will best serve the purpose of conservation of all kinds of material."

Circular No. 92 reads as follows: On account of the shortage of iron and steel, the War Industries Board and the Council of National Defense call attention to the necessity for picking up and either selling or reclaiming every piece of scrap iron or steel, dismantled machinery, obsolete iron and steel material or machinery that can be found on each road. The Railroad Administration directs that special attention be given this matter and all such scrap metals and material be disposed of to the best advantage as soon as possible. A thorough canvass of the entire situation should be made, taking into consideration unused plants with obsolete machinery, or rail and fastenings laid in abandoned gravel pits, industry tracks, logging roads, etc., etc., which are no longer of use. Each road will please report to this office on or before May 31, what has been accomplished.

WESTERN ROADS USE GOVERNMENT LABOR AGENCIES

Railroads under the authority of the Western regional director have agreed to discontinue the use of employment agencies conducted for profit and to obtain their track labor exclusively through the United States employment

service. The carriers' own free labor agencies are to be continued as branches of the United States free employment service. The employees of these agencies will be appointed examiners in the federal service at one dollar a year, and will continue to receive their regular compensation from the railroads. Those agencies operating labor camps under contracts with railroads have similarly been taken over by the United States employment service. Although private labor agencies will no longer be used by the roads, the United States employment service is taking over many of the best operatives of these organizations. In Chicago alone 20 employees of labor agencies have joined the United States employment service and in Omaha four have been employed.

The plan for recruiting track labor under the new arrangement has been worked out by Dr. P. L. Prentis, superintendent of District 7 of the United States employment service, with headquarters at Chicago, and W. G. Bierd, chairman of the Chicago Railroad Presidents' Committee, who is the representative of R. H. Aishton, regional director. Several railroad officers with practical experience in employing laborers have assisted them in this work. Dr. Prentis and the superintendents of the other districts of the United States employment service in the western railroad region will supervise the recruiting of track labor in their respective territories, in co-operation with the existing organizations maintained by the railroads. Each superintendent will aim to supply the labor demand in his own territory and in case he secures an excess will turn over the surplus to adjoining districts in need of men.

In a supplement to circular No. 63 fixing maximum rates and working conditions for track labor the Regional Director of Western Lines states that the roads should advertise for labor only in exceptional cases. In a further supplement dated May 16 instructions were issued that "In order to avoid any misunderstanding, and the possibility of laborers transferring from one line to another, effective at once, please discontinue the payment of time and a half for Sunday work to section and extra gang track laborers, regardless of whether the practice was in effect prior to the issuance of Circular No. 63 or not."

RAILWAY ASSOCIATIONS APPROVED

Shortly after the government took over the roads the temporary authority was issued to the carriers permitting them to make the same contributions for the support of associations which they had done previously until April 30. The government has now taken action on these associations and has specifically approved the American Railway Engineering Association, the American Railway Bridge and Building Association, the Roadmasters' and Maintenance of Way Association, and the American Wood Preservers' Association in the maintenance of way field and most of the associations serving other branches of railway operation. This approval carries with it the authority for the roads to continue to support these organizations financially as in the past.

CEMENT CONSUMPTION

The Western Regional Purchasing Committee has addressed a communication to purchasing agents pointing out that "there may be a shortage of cement and asking that they file with the requirements division, estimates of their needs for the year: (a) The number of barrels required. (b) What part of your requirements has been contracted for or purchased. (c) Names and addresses of companies with which you have contracts, or with which you have placed orders, the quantity, price, and f. o. b. point in each instance. (d) Location of mills

from which the balance of your supply would naturally come, in order to serve your company most economically, taking into consideration transportation and price."

COMMITTEES TO BUY TIES

The Western Regional Purchasing Committee recently issued Circular No. 6 containing the names and territories of sub-committees for the purchase, inspection and handling of crossties as follows:

Michigan and Wisconsin—

I. E. Seddon, purchasing agent, C. St. P. M. & O., St. Paul, Minn., chairman.

E. T. Stone, purchasing agent, M. St. P. & S. Ste. M., Minneapolis, Minn.

L. S. Carroll, general purchasing agent, C. & N. W., Chicago. Minnesota and West to Cascade Mountains, and South to Northern Boundary of Iowa, South Dakota, Wyoming and the Salmon River in Idaho—

F. G. Prest, purchasing agent, N. P., St. Paul, Minn., chairman.

J. W. Taylor, assistant to president, C. M. & St. P., Chicago.

F. A. Bushnell, purchasing agent, G. N., St. Paul, Minn.

West of Cascade Mountains and South to California Line and South of Salmon River in Idaho—

G. W. Saul, purchasing agent, O.-W. R. & N., Portland, Ore., chairman.

F. G. Prest, purchasing agent, N. P., St. Paul, Minn.

F. A. Bushnell, purchasing agent, G. N., St. Paul, Minn.

California, Nevada, Utah, Arizona and New Mexico—

F. W. Taylor, general purchasing agent, S. P., San Francisco, Cal., chairman.

M. J. Collins, general purchasing agent, A. T. & S. Fe, Chicago.

W. T. Jacobs, purchasing agent, W. P., San Francisco, Cal.

Colorado, Wyoming, South Dakota, Nebraska and Iowa—

L. N. Hopkins, purchasing agent, C. B. & Q., Chicago, chairman.

F. D. Reed, general purchasing agent, C. R. I. & P., Chicago.

W. E. Lefaiyre purchasing agent, D. & R. G., Denver, Colo.

Missouri, Kansas, Arkansas, Oklahoma and Illinois—

N. M. Rice, second vice-president, St. L.-S. F., St. Louis, Mo., chairman.

C. A. How, general purchasing agent, M. P., St. Louis, Mo.

W. S. Atkinson, purchasing agent, K. C. S., Kansas City, Mo.

Texas and Louisiana—

N. P. Randolph, purchasing agent, Sunset Central Lines, New Orleans, La., chairman.

T. H. Ryan, purchasing agent, V. S. & P., New Orleans, La.

R. L. Irwin, purchasing agent, T. & P., New Orleans, La.

Each committee is to make a comprehensive survey of its respective territory and report to the regional purchasing committee. This circular is accompanied by a questionnaire, regarding tie requirements, which is given in full below.

CROSS TIE PURCHASES

Under date of May 15 the Western Regional Purchasing Committee issued supplement No. 1 to R. P. C. Circular No. 7 relative to the handling of orders and contracts as follows:

"The Central Advisory Purchasing Committee at Washington have now decided as follows:

"The proposed plan for turning over to the purchasing agents of producing lines for handling, inspecting and shipping from one road to another unfilled contracts or orders placed prior to government action March 13, 1918, as outlined in R. P. C. Circulars 1 and 7, cannot be made effective in time to avoid delay in delivery for this season's requirements. Therefore the following will be observed:

"1. All contracts or orders for cross ties placed prior to government action March 13, 1918, must be handled on their merits. Roads having such contracts or orders unfilled should immediately take up with the contractors the questions of completing shipment by June 15.

"2. There may be old contracts made at low prices that should be revised. In such cases the committee will

consider such recommendations as the roads submit. In the event of any question as to adjustment of price, the matter should be taken up direct with the contractor and if an increase is warranted, the recommendation of the road interested should be submitted for approval to the Regional Purchasing Committee with full explanation.

"3. The receiving roads will continue to take up and inspect the ties the same as heretofore. It is hoped that all such contracts or orders as are not completed by June 15 should be given special consideration at that time as to the best means of handling and completing them.

"4. All embargoes on ties to be shipped from one road to another should be lifted and the ties moved as soon as possible.

"5. The road on which ties are produced will give every assistance possible to secure prompt completion of such orders and contracts.

"6. If there is any shortage of cars for moving ties, the matter should be brought to attention of Regional Director."

WAGE ADVANCE APPROVED

Director General McAdoo has authorized the wage increases recommended by the Railroad Wage Commission in its report, under which advances are given to all employees receiving less than \$250 per month, estimated to aggregate \$300,000,000. The report is a voluminous one of 150 pages, with many tables showing the application of the rates of increase to the various classes of employees. The following is an abstract with particular reference to its application to the maintenance of way department.

It is hardly realized that the roads themselves have in two years, 1916 and 1917, increased wages approximately \$350,000,000 per year, if applied to the present number of their employees. But these advances were not in any way uniform, either as to employments or as to amounts or as to roads. The situation had been dealt with as pressure made necessary, and naturally those who, by organization or through force of competition, could exert most pressure fared best.

We have had a most exhaustive study made of the cost of living to-day as contrasted with the cost of living in the latter part of 1915, when, by the reaction of the European war, the American people first felt keenly the increase in the burdens of life and the need for higher wages. And to our minds it conclusively establishes two things, (1) that the cost of living has increased disproportionately among those of small incomes, and (2) that there is a point up to which it is essential that the full increased cost shall be allowed as a wage increase, while from this point on the increase may be gradually diminished.

With the various conditions which have been detailed all in mind, the commission has reached the conclusion that the fairest method of dealing with the problem of wage increases is to award increases on the following scale:

The Scale Recommended

1	2	3	4
To the monthly rate of pay of men receiving in December, 1915, the amounts named in this column	Add the per cent named in this column	Equivalent to amount named in this column	Making new rate per month as shown in this column
Under \$ 46.00	....	\$20.00	....
\$ 46.01 to 47.00	43.00	20.21	\$ 67.21
50.01 to 51.00	42.35	21.60	72.60
55.01 to 56.00	41.00	22.96	78.96
60.01 to 61.00	41.00	25.01	86.01
65.01 to 66.00	41.00	27.06	93.06
70.01 to 71.00	41.00	29.11	100.11

75.01 to 76.00	41.00	31.16	107.16
80.01 to 81.00	40.44	32.75	113.75
90.01 to 91.00	36.38	33.10	124.10
100.01 to 101.00	31.29	31.60	132.60
110.01 to 111.00	27.12	30.10	141.10
120.01 to 121.00	23.64	28.60	149.60
130.01 to 131.00	20.69	27.10	158.10
140.01 to 141.00	18.16	25.60	166.60
150.01 to 151.00	15.96	24.10	175.10
160.01 to 161.00	14.04	22.60	183.60
170.01 to 171.00	12.34	21.10	192.10
180.01 to 181.00	10.83	19.60	200.60
190.01 to 191.00	9.48	18.10	209.10
200.01 to 201.00	8.26	16.60	217.60
210.01 to 211.00	7.16	15.10	226.10
220.01 to 221.00	6.15	13.60	234.60
230.01 to 231.00	5.24	12.10	243.10
240.01 to 241.00	....	9.00	250.00
249.01 to 250.00	....	.00	250.00

Application of these new wages to the present pay rolls of the railroads, as nearly as may be, indicates that the net wage increases granted will approximate \$300,000,000 a year.

Application of the Scale

These increases are to be applied to the rates of wages in effect on December 31, 1915. They do not represent a net increase at this time. Because our figures as to the increase of living costs have been gathered with reference to the two-year period, January, 1916, to April, 1918, the wage increases are reckoned with respect to the same dates. The section hand who on December 31, 1915, received a wage of \$50 per month will receive an increase of \$21.50 per month, less whatever his monthly wages as section man may have been advanced in the intervening two years.

In the application of the scale the wage runs with the place. If in the past two years an employee has been promoted, his new wage is based upon the rate of increase applicable to the new schedule governing the new place.

There are some few cases where the roads, by reason of abnormal conditions, largely local, and arising out of the extreme competition in certain trades, have granted wage increases which will well-nigh cover, if not altogether cover, the increases here made. As to those who have received such increases, we advise no other course than that the scale be adhered to, for it has its foundation in principle and not in the compelling force of any unusual competitive conditions. In no event, however, should there be any reduction in wages from those now obtaining.

The wage increases provided for in the scale shall be effective as of January 1, 1918, and are to be paid to all who were then in the railroad service or who have come into such service since and remained therein, according to the time served. The proper ratable amount shall also be paid to those who have been for any reason since January 1, 1918, dismissed from the service, but shall not be paid to those who have left it voluntarily, because remaining in the service was the consideration of the promise to make the increases effective from the date mentioned. Men who have left the railroads to enter the army or navy shall be entitled to the pro rata increases accruing on their wages up to the time they left, as they have continued in the service of the nation. The same rule shall apply to those who have passed from one branch of the railroad service or from one road to another.

Application of Rates to Employees on a Daily Rate of Pay

Sectionman C was employed in 1918, but not in 1915. The rate of pay on the division where he is employed

in 1918, in 1915 was \$1.10 per day of 12 hours, 7 days a week. The 1918 rate of pay is, on the same division, \$1.50 per day, for the same hours. The monthly rate in 1915 was therefore \$33. It is now \$45. Under the commission's plan of increases he will be entitled to \$53 per month (\$20 increase), or \$8 per month more than his present rate for straight time. He will, therefore, be entitled to receive from January 1 to April 30, \$32 back pay and in the future to receive \$53 per month of 360 hours. His back pay will be computed in the same manner for all overtime worked since January 1, 1918.

Modifications by Director-General

In putting the commission's plan into effect the Director General made a number of modifications, of which the following are of interest to maintenance men: In addition to the ordinary scale of increase, day laborers, employed mainly on track work, are to get at least 2½ cents an hour more than they received last December 31. The principle of the basic eight-hour day is recognized, but will not affect the wage advances, as the daily pay of a man working 10 hours under the new rates will be considered as consisting of eight hours of straight pay plus two hours' overtime.

THE REPAIR OF DRY STONE WALLS

ALTHOUGH LITTLE STONE masonry is built to it is not many years since this type of construction was almost universal, and owing to the fact that many of these piers and abutments are still in service, the maintenance of stone masonry plays an important part in the duties and problems of the bridge supervisor. One phase of this subject which is not often discussed is the treatment of stone walls, originally laid dry, to secure longer life. This was the subject assigned to one of the committees of the American Railway Bridge and Building Association last year, which committee presented some valuable data, collected from various railways, at the last convention of the Association.

In answer to an inquiry as to the advantages or effectiveness of pinning and pointing the joints in the face of old stone masonry walls, originally laid dry, where the walls are not to be grouted at the same time, some replies were received which are abstracted as below:

On the Boston & Maine, as a rule, it would not be considered necessary to pin and point joints in old stone masonry originally laid dry, unless some special case required it. There are a large number of pieces of old rough stone masonry on this road, laid dry years ago, that are rough and open. In such cases the labor of pointing is practically thrown away, unless a more sightly job is required.

On the Boston & Albany the opinion is that with old masonry laid dry, if the foundation is in good condition, pinning and pointing should be done as quickly as possible to prevent the stones from working. Should there be any movement in the masonry, joints are almost sure to show up.

A suggestion received from the Chicago & North Western is that joints in old stone masonry, laid in mortar, should be pointed when the mortar has fallen out for a depth of ½ in. in most of the joints. If this is a small job, it can be deferred until other work of the same nature develops in the vicinity.

The idea on the Lehigh Valley is that there is little reason for pointing stone masonry laid dry, which is not to be grouted at the same time, unless the walls are failing, and appearance is important. The reply from the Bangor & Aroostook recommends the pointing of old

masonry originally laid dry only when grouting at the same time is contemplated.

In answer to an inquiry regarding the benefits to be derived from the grouting of masonry originally laid dry, a reply was received from the Lehigh Valley to the effect that the grouting of dry masonry would greatly prolong the life of a wall if properly done. It recommended closing and pointing the joints for a height of several feet at a time, starting at the foot of the wall, and providing small openings in the walls at intervals through which to pour in the grout, continuing this process until the top of the wall is reached. It also recommended that walls be pointed and grouted before being subjected to heavier loads, to prevent distortion and shifting of stones. The opinion received from the Chicago & North Western was that a good masonry wall cannot be made by grouting old masonry.

The Boston & Albany recommended the prompt grouting of dry walls, with a view to preventing movement in the masonry, especially if it contains small and ill-fitting stones. Where old masonry has been laid up dry for any length of time the pointing and grouting of walls was favored to fill all voids and stop any movement liable to take place in the masonry, but if the stone has not been cut, it is considered unwise to spend much money on masonry laid dry. The experience of this company is that old masonry which is deteriorating usually gives plenty of warning, in which case a reinforced concrete bridge seat proves effective. Concrete bridge seats on cut stone masonry laid dry have been holding up well under increased loads, where the foundations were in good condition. This company does not, however, recommend pointing or grouting if the old foundations are poor and show signs of settling under the old masonry.

The Boston & Maine recommended grouting as soon as the walls show signs that the stones are working loose, and in cases where the original walls are of sufficient area to carry increased loads and the foundations are in good condition, it was the opinion that grouting could be done with economy and usually with satisfaction.

According to practice in grouting on the Lehigh Valley the face joints should be thoroughly wedged and packed and then pointed for a height of three or four feet from the bottom. At that point small stones should be removed at intervals of five or six feet. The grout should be poured into the wall by the use of a pan-shaped sheet-iron spout that can be inserted into the wall for a short distance, the grout to be poured until it reaches the height of the pointing. The temporary openings should then be closed, and another section of three or four feet in height should be pointed in the same manner as above described, this method to be continued until the top of the wall is reached. The grout should not be expected to run any great distance, and those in charge of the work should be guided by personal observation while the grouting is in progress.

On the Boston & Maine the joints of walls to be grouted are thoroughly cleaned of all debris and carefully pointed, and the grout is placed as far back from the face as possible, using a wet mixture that will run into voids otherwise inaccessible. The results in this class of work have been uniformly good.

BUGS STOP TRAIN—A freight train on the Chicago, Burlington & Quincy was stalled on May 7 near Stockholm, Wis., when it ran into an immense cloud of shad flies. The crushed bodies of the insects lubricated the tracks to such an extent that the driving wheels slipped. It was necessary to clean the rails before the locomotive could make headway.

STOP WASTE AND HELP WIN THE WAR

Abstract From Suggestions Received From Foreman on the Northern Pacific Regarding Ways of Saving Labor and Materials

A CIRCULAR HAS just been issued by the Northern Pacific entitled "Stop Waste and Win the War," which is being distributed among employees of the maintenance of way department with the idea that the conditions created out of the war make it necessary for every railway officer, including the foreman, to give more attention than ever to the avoidance of waste in labor and materials. This circular is based on suggestions received from section and bridge foremen in response to a circular proposed by O. C. Wakefield, general storekeeper, asking what could be done to make all material and every day's work count to the best advantage. Foremen are requested to file this circular.

TRACK DEPARTMENT.

Saving Material.

When I order material I am very careful to order for immediate use. I have also gone over carefully with my men the importance of watching each piece of scrap to see that none is wasted and that all is picked up.

I keep all coal picked up around coal docks so that none of it is wasted.

Bolts should never be knocked off with a chisel except when they turn in the angle bars. I put a little kerosene on a bolt I expect to take out and can generally turn the nut. I think I save at least 50 per cent of the bolts in this way.

I never cut a 30- or 33-ft. rail when a short piece is needed, I always save a piece of rail with a broken end to cut short pieces from instead of cutting a good rail. When changing rail or repairing track, I never cut a bolt when I have time to turn the nut off with a wrench.

I keep all bolts on hand oiled and under shelter in order to keep them from rusting.

I keep material on hand well piled. Do not let it lie around and get lost.

I go over the bolts every spring and turn the nuts almost off, oil the bolts with black oil and then tighten the nuts again, being sure not to tighten them too much.

When making requests for material I state what the material is required for; then the roadmaster can use his own judgment and furnish new or second-hand.

When renewing ties, I do not take out an old tie if there is a new or good tie on each side of it, unless there should be six or seven rotten ties to one rail, in which event some must be renewed.

When an outfit is reduced or taken off, outfit cars should be moved to terminals and the superintendent's office notified. Then the bunk tables, benches, windows, doors, sinks and shelving may be removed when cars are not in use. This furnishing is expensive to build and place in cars, and every year lumber, hinges, locks, nails, galvanized iron and stoves cost considerable.

One saving in switch points comes from good full ball stock rails, which affords protection to the points. This is one feature which is usually overlooked.

I oil bolts about a week before I tighten the nuts and thereby give the oil a chance to cut the rust off the thread and burr.

Second-Hand Material.

I use all old spikes and other second-hand material as far as possible in renewals or repairs. I save a great many old spikes, as there are many old ones which can

be used again if they are straightened, that is if they are not cut in the neck so bad that they cannot be used again.

When changing ties, if the bottom side of one is found to be sound, I turn it over and put it back in track.

During winter months there is a lot of material, such as broken bolts, etc., which gets covered with snow. My first object in the spring is to gather up all material that is scattered.

I look over the scrap pile before shipping and see that all the good bolts and spikes are picked out.

On crossings where there is heavy traffic and planks wear down fast, I turn them over, change ends and shim up worn places to make them even with the rail.

If necessary, when changing crossing planks, I put new ones only in public crossings and use old ones for private crossings, instead of throwing them away or burning them.

Legs of snow fences should be picked out and sent to the division storekeeper or snow fence stakes should be made of them.

A great saving is made by transferring from the main line angle bars which are broken in the quarters to tangent of side tracks when the angle bars contain two bolt holes, as two tight bolts are better than four loose ones.

Instead of ordering new ones, switch stands may be transferred in the same way as other material (where they are partly worn) from main line and also main leads of yards, to tracks that are seldom used.

I find that I have saved a number of posts by resetting them with the top end down.

If the end of a bolt is battered, I take a file and file the threads so it can be used again.

While on my trip over the section each day, I gather up all scrap iron, knuckles, pins, bolts, old spikes or any other material that might be of value and take it to the section tool house so it will be saved.

Care of Tools.

I instruct my men to use tools in a careful manner so they will not break shovels, maul or pick handles. I watch the men so they will not do unnecessary work.

When tamping ties, many track shovels break just over the shovel blade, after which they are not good for tamping, but I use these shovels for grass cutting because at this time shovels have to be filed and sharpened, and by using the broken shovels we save the new ones.

I think it means a great saving in labor if each foreman always keeps his motor car in proper repair. I always get to the tool house 15 or 30 min. ahead of time in the morning and look over my car. If a bolt is loose, I tighten it; if small leak appears, I repair it. Consequently, I always get my men to work on time.

Do not allow men to nip up ties with shovels, as this is the way most of the shovels are broken.

In the spring, when I have a motor car, I turn in my hand cars so that extra gangs may use them.

I return hand cars in the spring to division headquarters for the use of extra gangs. I pick up all scrap.

Saving Labor.

In the spring I start renewing ties as early as possible, because at this time men can put in more ties than they can in the hot months of summer.

When laying a new tie, I am particular to see that the

men do not dig too big a space for it, for this is a waste of labor and also leaves a loose roadbed.

I go over my switches every morning to see that they are all in good working order so that trainmen will not be delayed in switching and doing their spotting.

In order that they will not have to send one or more men back to the tool house for additional tools, I always make sure to have all necessary tools before leaving the tool house.

I think that a good bit more can be accomplished by working in harmony with the weather, for sometimes more harm than good is done by stirring up the roadbed in extremely wet weather; for example, putting in new ties and surfacing or picking up low spots. Cutting weeds, shoveling cinders, cleaning up rubbish, etc., is more economical work during wet weather.

Many foremen let a crew of six or eight men cut weeds on a rail length of track. As a result, there is too much talking and moving. Men should work in pairs, one on each side of track, and each pair have from six to ten rail lengths to cut. Less moving about and less talking is the result. The same applies to cleaning out cinders on a cinder dump. Always give each man the same distance, if conditions are equal.

All hard labor (when possible) should be accomplished in the morning when the men are fresh and more willing to perform such tasks. Choose lighter work for the remainder of the day.

BRIDGE AND BUILDING DEPARTMENT.

Saving Material.

I do not use over-size nails where smaller nails will answer the purpose as well. This saves material.

Undoubtedly much material can be saved by the foreman if he keeps a close tab on everything. He should see that ladders, ropes, brushes and other tools are properly taken care of, that brushes are worn out before they are discarded, that barrels and cans are cleaned free from paint before they are returned, that each kind of tool and material is kept in its proper place where it can be found when wanted, and that no paint is left in the bottom of pots where it will be allowed to dry and spoil.

Second-Hand Material.

When I take down a scaffold or any other temporary piece of work, I gather up all the material. The nails are pulled out and the material piled in tip-top shape inside some place so it can be used for the next job that turns up.

Old second-hand bridge bolts can be used more or less on other kinds of work by cutting them off and rethreading. Old C. I. washers are usually as good as new ones. Second-hand galvanized iron can be re-used to a certain extent when rebuilding bridges.

By using good second-hand material, or new material of lengths that will not have to be cut, a saving can be made when constructing staging or other falsework.

I watch valve fittings and tinware of various kinds before shipping in as scrap, with a view to repairing as much as practicable locally, instead of letting it go to the shops.

Old stringers can be used for mud sills and bulkheads, old bridge ties for stockyard fence posts, old lining spikes can be straightened and used again, instead of new ones, also old bolts.

Saving Labor.

In order to avoid handling so much of it over again when it is used, when unloading material for construction work, I take care to separate lumber of different dimensions as much as practicable.

GENERAL.

One foreman suggests that all foremen make an effort to particularly lay emphasis on the following:

Be punctual at all times.

Be boss *yourself*. You are responsible to your superior.

Centralize your forces, one thing, well, at a time.

Have no favorites. If you do, the whole bunch will want favors.

Study individual adaptability, a good jack man saves time. Let the good spiker use the maul and the poor one nip. The good dresser can dress and the poor one fill in gravel, etc.

When you're working at the end of your section, pick up your scrap as you come home and pile track scrap and car scrap separately, convenient for loading where you get supplies.

As you collect scrap rail from any source, keep a copy on hand in your day book of weights, lengths, etc., so that when your roadmaster requests information you save time by instant reply.

When you receive and unload material, segregate all classes and weights and fastenings, *then and there*, and make it easy to inventory and facilitate loading again.

Do not scrap any material which can be safely used longer.

When renewing ties, save all usable spikes, even though they drive hard. Pick up all spikes when *pulled* and lay back away from diggings. Many *kegs* of spikes are lost in the ballast every season.

Work with your men. If you are *lazy*, you can expect the disease to spread and take with your gang.

Study weather conditions for different classes of work. For instance, if you set aside a *certain* day to cut *brush, rain or shine*, you'll lose your gang.

Make your reports *on time*. You may hold up the forwarding of the whole district's report.

Five minutes spent in tacking up a barbed wire may save a half a day burying an animal, an expense of a \$100 bill, a few reports, a trip or two for the claim agent, a family without milk and butter, the loss of 1,000 lb. of meat and possibly a wreck.

Do not allow your men or yourself to step or walk upon a pile of rails, either in a pile upon skids or lying upon a car, while they are handling a load, with their feet *parallel with the ball of the rail*. Place your feet across or at right angles while doing so. You're apt to get caught with the sole of shoe between two rails, fall over and break your leg.

Haul a load both ways when practicable.

When you see a dangerous condition of any kind, whether it belongs to *your department* or not, and you can prevent damage to property or save a life, make repairs *at once*. Your superior officers will give you an order covering it. It all belongs to the same company.

Other Suggestions.

What work I do I like to do well and not half do it, because half-done work does not last and must be done over and over and not much progress is made. It is not always how hard a man works, but how he does his work, with the idea of having it last or just to get away from it to be back at the same place to put in another half job the next day.

In all crews some men are better at certain things than others who are equally as good men in a general way. Whenever possible I choose and place my men so that each man's work will show up to the best advantage.

I always see that tools that my crew uses are in good condition, ready for the work required of them, and find

that this rule is a large labor saver if it is strictly carried out.

By doing good, solid and safe work wherever a man works he will not be required to do things over for some time. By handling all material in a careful way and avoiding waste wherever possible, much material can be saved.

I am with my men all the time, and so I avoid accidents and get as much done each day as possible.

I place men on work they seem best fitted to do.

I always plan my work several days in advance.

I fix a defect as soon as possible so that it will not develop into a large one and require new material, when prompt action on my part would have prevented this.

I keep my men well posted on safety rules, and do not let them work with defective tools.

Keep each thing in its place.

Remove all broken or defective rails or any defective material from the track before it becomes unsafe for

travel, and this in the end will save material and labor.

It is better not to change from one job to another too often. Stay at the work in hand until it is finished.

I always try to keep stock off the right-of-way.

I always get the men organized and then each man knows what he has to do.

I never keep more material or tools on hand than I need.

When working new men, change them about until you find out in which work you get the best results from each.

Foremen should bear in mind, "Safety first," and permanency in all work, and train their men to take an interest in good work, and then they will have no trouble in getting good work done. First-class work is not only a saving of time, but of material as well.

We are indebted to A. M. Burt, acting general manager of Lines East of Paradise, Mont., for a copy of this circular containing this information.

Durability of Untreated Piling Above Low Tide

BY C. H. TEASDALE AND MABEL E. THORNE

Forest Products Laboratory, Madison, Wis.

IT HAS LONG BEEN recognized that wood constantly immersed in water is not subject to decay. Timber structures in fresh water or in water free from the various forms of marine wood-borers remain sound indefinitely, unless affected by some destructive agent other than decay.

In tidal water, where marine borers are not active, portions of piles that are completely immersed at each high tide may be exposed at other times without danger of decay, for though completely immersed only part of the time, they may be practically saturated all the time. The extent of this saturation, and therefore permanent preservation against decay, is an item of considerable interest and importance in designing pile construction. Because there is so little available data as to the extent of this immunity zone, the Forest Products Laboratory has recently been conducting a study of the subject by the questionnaire method. Replies to the questionnaire are given in this report.

EFFECT OF SETTING IN EARTH

A few of the replies make note of the fact that piles set in an earth wharf are free from decay to a greater distance above mean low tide than those set alone. For example, Edwin Lord, harbor master at Bangor, Me., writes that "where the wharfing and piling have been covered with earth and saturated at high water the timber remains sound. I have seen the wharfing uncovered and the logs apparently in perfect condition where they have laid for nearly 70 years."

Raymond F. Bennett, president Bennett Contracting Corporation, Portland, Me., states that "for piles driven in a solid earth wharf, the height of no decay would be higher than for piles standing alone, and this height would also increase with the distance of the pile from the edge of the fill. A Boston engineer who designed a structure to be built on a solid fill wharf in this harbor, stipulated that the piles near the edge of the fill should be cut off 5 ft. above mean low tide; and that piles, say, 20 ft. and further from the edge of the fill, should be cut off at 7 ft. I think probably this is good practice."

The United States Engineer Office, Galveston, Texas, writes as follows: "A pile and brush dike was built about

1902 on the north side of Galveston channel, the piles being green with the bark on and their tops being about 4½ ft. above mean low tide. This dike was partially covered by material excavated from the channel, but some of the material has since washed away, so that the piles which remain now stand on ground which is possibly one foot above mean low tide. In other words, they stand in water part of the time. Those of the piles which have not been touched by the teredo are still sound, although the bark is gone." (Mean tide level is 0.3 ft. above mean low tide in Galveston harbor.)

The Commission on Waterways and Public Lands of Massachusetts reports: "A great deal of solid clay filling has been done in Boston, and piles driven into it have been found solid up to 13 ft. above low water 30 years after they were driven. Above that level they were practically all decayed, the filling above the clay being gravel." (Mean tide level here is 4.5 ft. above mean low tide.)

H. E. Manvel, vice-president, Rhodes & Manvel, Inc., states that: "We have also found that on foundation piles driven in salt meadow which is permanently wet to high water line, that capillary action saturates the piling for a distance of 12 to 18 in. above the high water mark, and it is very seldom that the piling will rot below that point, so we can broadly state from our experience that timber and piles will be saturated on an average from 1 to 2½ ft. above the water level.

The extent above mean low tide to which these piles remain sound may be explained by the fact that salt has certain preservative properties.

PROTECTION FROM WEATHER

Protection from the action of the weather is also an important factor in the durability of piles. The following replies mention this point:

T. A. Scott, harbor master, New London, Conn.: "Piles or timber extending above mean low water (New England coast), which are saturated every high water will stand preserved for at least 50 years and longer if that part of the timber exposed to the atmosphere all the time is under some protection from the weather."

S. R. Alexander, acting harbor engineer, Baltimore,

Md.: "I also noted that timbers buried in earth filling behind bulkheads were in much better condition than those exposed to the air, even though the latter were in many cases lower than the former."

Richard A. Monks, vice-president, John Monks & Sons, New York, N. Y.: "As foundation piles are not exposed to any drying factors, such as sunlight, etc., they should retain their life indefinitely, if cut about half tide or below this level."

RELATION OF DURABILITY TO MEAN TIDE LEVEL

The climate of the northern states is more favorable to the long life of piling than that of the southern states. From the data at hand it would seem that the line of de-

marcation between the harbors in which it is safe to cut off piling at mean tide level or above and the harbors in which it is not safe lies somewhere between New York and Baltimore.

The rate at which a pile dries is largely dependent on temperature and relative humidity. The relative humidity varies only slightly from Maine to Florida, while the temperature variation is considerable. This means that, a few hours after high tide, piles in southern waters will have a much lower percentage of moisture than those in northern waters, which, combined with the encouragement to the growth of fungi furnished by the higher temperatures, probably accounts for the variation in the extent of the zone of safety.

Service Results With the Tie Tamper^{*}

BY G. W. VAUGHAN,

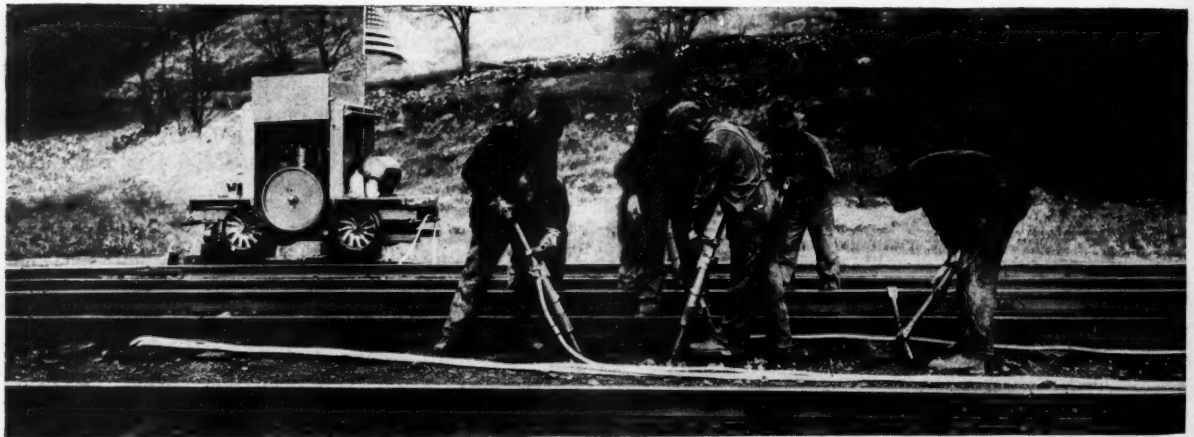
Engineer, Maintenance of Way, New York Central

THE NEW YORK CENTRAL first began experimenting with the tie tampers in 1913. The outfits used at the present time are known as the two and four-tie pneumatic tamper outfits, the two-tamper electric outfit with electric generator set, two-tamper electric with resistance set and two-tamper electric with compound motor set.

The compressor plant and car are operated by the foreman or by a man picked from the section crew, who shows

continued while work was being done. In one particular case, 6 men did the work of 30 men.

The pneumatic tampers do better and more thorough work than can be done with picks or bars in the hands of the average track laborer. The track laborers prefer these tools to tamping picks or bars on account of the ease in handling and because they can tamp the ties without bending their backs. There is no difficulty in holding the tool to tamp directly under the rail, in and about



GANG AT WORK WITH A FOUR-TOOL OUTFIT

adaptability to handle machinery. The operation consists simply of starting and stopping the gasoline engine, the operator working in the gang when not so employed. The tampers are handled by ordinary laborers, who hold them in a vertical position with the broad face of bar against the tie until the end of bar reaches the bottom of the tie, then, by swinging them back to the proper angle, the ballast is driven under the center of the tie. In its work the tool tamps the ballast under the tie, in about the same manner only more thoroughly than the tamping picks. The pneumatic tamper, however, can be used more advantageously in many ways, especially around slip switches and in tunnel work where a small number of men with tampers will do the work under traffic where formerly large gangs were employed and traffic discon-

turnouts, frogs and other cramped quarters, or at water pans where track is more or less flooded with water. The operation of the pneumatic tampers is more efficient here than any hand tamping tools.

Owing to the shortage of labor during the year past, the force on a four-track railroad with sections of 11 equivalent miles has consisted of a foreman, two men and a tamping outfit. By leaving the outfit out on the line and by using a work train crew to shift it each morning or night, the foreman was able to tamp every tie in his two fast express tracks in addition to installing ties and taking care of work ordinarily done by 10 men.

Ties can be dug out and other ties can be spotted in and thoroughly tamped without disturbing adjacent ties, thus expediting tie renewals and the resurfacing of the track. By equipping it with a rose drill, it can be used for drilling holes in rock excavations.

^{*}Abstracted from a paper presented before the New York Railroad Club on May 17.

Track surfaced by pneumatic tie tampers is more even in surface and stands up longer under traffic than when tamped by hand. As an illustration, two miles of track on a good sub-grade on the New York Central was tamped by machine and was not resurfaced for two years, there not being a soft spot that needed it. Another section of six miles in length (nine equivalent miles) was very difficult to keep in good condition on account of bad bottom. For the last two years this section has been kept in good condition with a force consisting of a foreman, four men and a tamping machine. This could not have been done without the machine except by a larger gang. All foremen who have used machines, agree that, when they have a machine with a small gang of men, they can get work done that it would be impossible to do with a small gang without the machine.

Besides the advantages mentioned above there is an immediate economy in the use of the machine. During 1917 observations were taken on three main line sections, on each of which we had a foreman and four men, with a two-tool pneumatic tamping outfit and giving the track a surfacing lift of from 1 in. to 1½ in. Each gang surfaced an average of 10 rails a day, while it was found that a gang of the same size, without a machine, and working under the same conditions, surfaced only five rails per day. In other words, the gang with the machine surfaced a mile in 16 days and the one without a machine in 32 days. Ordinarily, with laborers' wages at 22 cents per hour, it will cost from 10 to 25 cents each to tamp a tie with a tamping pick. A competitive test of hand versus machine tamping on one of the large railroads, using a four-tamper gasoline outfit, gave the following results:

	Number of Men	Time Hours	Feet of Track Tamped
Hand Gang	16	8	500
Foreman			
Machine Gang	6	8	528
Foreman			
Saving	10	80 hrs.	28
	Number of Men	Wages	Expenses Operating Over-head, etc.
Hand Gang	16	\$43.50	Total \$43.50
Foreman			
Machine Gang	6	\$18.50	\$6.95
Foreman			
Saving	10		\$18.05

Assuming a tamping season of 200 days the annual saving in favor of machine tamping amounts to \$3,610.

A test made on the New York Central to determine the cost and rate of work was as follows:

DAILY COST WITH MACHINE

1 Foreman, 10 hrs. @ 32c.....	\$ 3.20
4 Men, 10 hrs.—40 hrs. @ 22c.....	8.80
12 Gals. of Gasolene @ 24c.....	2.88
Oil—2 pt. @ 6c.....	.12
Total	\$15.00

DAILY COST WITHOUT MACHINE

1 Foreman, 10 hrs. @ 32c.....	\$ 3.20
4 Men, 10 hrs.—40 hrs. @ 22c.....	8.80
Total	\$12.00

COST PER MILE OF TRACK

Without machine 32 days @ \$12.....	\$384.00
With machine 16 days at \$15.....	240.00
Difference in favor of machine.....	\$144.00

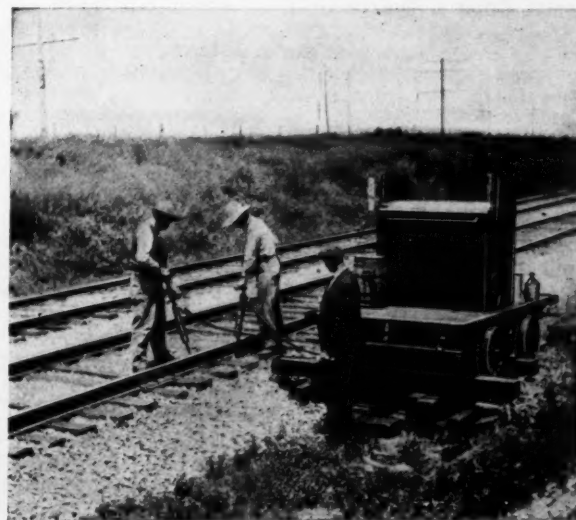
FIXED CHARGES

When we began the use of the tampers we assumed:	
Depreciation at	10 per cent
Interest at	5 per cent
Repairs at	5 per cent
Total fixed charges.....	20 per cent

Our experience for several years indicates that the depreciation and repairs are much less than that assumed. However, we continue for the present to use the above figures. We find that under normal conditions each machine will be used for tamping 20,000 ties per season. On this basis the fixed charges amount to \$0.02 per tie, or \$64 per mile surfaced. Therefore, allowing for fixed charges in the above statement, we will still show a saving in favor of the machine of \$80 per mile.

Our machines, under adverse conditions, have been used for surfacing from three to six miles per season, and, normally, should average at least six miles. Hence the annual saving per machine is quite substantial. This does not take into account the secondary saving due to the greater stability of the track.

Twelve of these machines are now being used in the electric zone, and others are in service on the exterior zone. In the electric zone current is taken from the third rail and is conveyed to the machine through resistance boxes by means of a contact device which is laid across



TWO-TOOL CAR AND CREW

the rails. In the exterior zone the power is secured from a generator set mounted on a hand car which weighs complete 2,150 lb.

As a further development, it has been planned to use the tampers in the electric zone between Utica and Syracuse. In this district, because of the varying voltage, it is not possible to use the resistance as in the electric zone. Instead, it is proposed to use a motor generator set in which both the motor and generator set are compound-wound. This motor generator set is so designed as to take care of the fluctuation in the voltage and, as the weight is only 240 lb., it can be easily handled by three men.

The generator set is enclosed in a strongly constructed box and moved to points where required. A third rail contact device has been designed which need not be removed for traffic. The cost of current for operation is 7 cents per hour on the basis of 3 cents per kw. plus 10 per cent for accounting.

In tamping track, the machines are generally operated in sets of three, so that in case of accident an extra tamper is at hand with which to continue the work. The tamping is done by two machines working simultaneously on opposite sides of the tie. With them it is possible to

tamp ties closer together than would be possible to tamp by hand, all the space necessary being that into which the tamping bar can be driven.

A test was made with a set of electric tampers late in the winter under unfavorable working conditions. They were operated in this case from an engine generator set mounted on a car. The outfit was assigned to a regular main line section gang consisting of one foreman and five men. Two men were assigned to each machine, which is necessary on account of the weight. Four men were doing the tamping and the fifth digging out and feeding ballast to the machine, dressing up track, etc. The work consisted in making the final surface after the track had been raised 12 in. previously but had not yet been put in service, the ties being tamped 16 in. on the outside of the rail and 8 in. on the inside. Under these conditions an average of 27 ties were tamped per hour. The following tabulation shows the daily cost of the work:

1 Foreman, 8 hrs. @ 32c.....	\$ 2.56	
5 Men, 8 hrs.—40 hrs. @ 22c.....	8.80	
Gasolene, 4 gals. @ 24c.....	.96	
Engine Oil $\frac{3}{4}$ pt. @ 6c.....	.04	
Total per day.....	\$12.36	\$12.36
Time of crew going to and from work.....	1.42	
Total Cost.....		\$13.78
Ties tamped.....	216	
Cost per tie.....		\$.064

Another test of tamping by hand under similar conditions shows, with the above, the comparative cost of tamping by hand and by machines. Tamping by hand, one foreman and six men at a cost of \$14.76 per day, tamped one mile of track in 26 days, or a total cost per mile of \$383.76. The gang with the electric outfit tamped a mile in 15 days, which at \$13.78 per day makes a total of \$206.70 per mile, showing a difference in favor of the machine of \$177.06 per mile.

The cost of tamping with electric tampers per foot of track, including fixed charges, figures up as shown below. The fixed charges are calculated on the basis of the actual costs of one engine generator set mounted on a car, two electric tampers, two resistances, including contacts, cables, etc., which are used when current is taken from the third rail instead of the engine generator set. The fixed charges per day are based on the assumption that the machine will be in service 180 days yearly:

TIE TAMPERS OPERATED FROM A GENERATOR

Operation	
1 Foreman, 10 hrs. @ 32c.....	\$ 3.20
5 Men, 10 hrs. each—50 hrs. @ 22c.....	11.00
Gasolene, 4 gals. @ 24c.....	.96
Engine Oil $\frac{3}{4}$ pt. @ 6c.....	.04
Fixed Charges	
Depreciation—generator at 15 per cent.....	.42
Depreciation—two tampers at 30 per cent.....	.67
Interest and Maintenance—generator at 10 per cent.....	.28
Interest and Maintenance—2 tampers at 15 per cent.....	.33
Total per day.....	\$16.90
Average of 356 ft. tamped per day, total cost per ft.....	\$0.047

TIE TAMPERS OPERATED FROM THIRD RAIL

Operation	
1 Foreman, 10 hrs. @ 32c.....	\$ 3.20
6 Men, 10 hrs.—60 hrs. @ 22c.....	13.20
Power, 96 kw. hr. @ 1c.....	.96
Fixed Charges	
Depreciation—2 tampers at 30 per cent.....	.67
Depreciation—2 resistances at 15 per cent.....	.08
Interest and Maintenance—2 tampers at 15 per cent.....	.33
Interest and Maintenance—2 resistances at 10 per cent.....	.06
Total per day.....	\$18.50
Average of 356 ft. tamped per day, total cost per ft.....	\$0.052

In above test the tampers were in actual service an average of 8 hours out of a 10-hour day. Where the tampers are operated from the third rail a watchman is employed to look out for trains.

THE MATERIAL MARKET

THE DEMAND FOR iron and steel for war purposes has become so great that the Government is now on the point of commandeering the entire iron and steel industry, so that practically no material will be available for other than war purposes. As stated by J. Leonard Replogle, steel director of the War Industries Board, in an address to the manufacturers, the filling of orders now on the books for plates will occupy 8 months, for shells 9 months, for bars 6 months, etc. Touching on the rail situation, he said: "We are rolling so much projectile steel in rail mills and the rail situation is becoming so acute—the Director General of Railways says he will have to have 2,000,000 tons—and any increase in rail production will necessarily increase our trouble as far as projectile steel is concerned. On rails, at the rate we have been rolling in the last three months, we have 92 weeks of work ahead of us."

Pending negotiations by the Railway Administration for its rail requirements, the mills are continuing to roll from 25,000 to 30,000 tons on orders received from the railways last year. Meanwhile, the nominal price for rails is advancing as indicated by mill quotations of \$61 to \$63 per gross ton for Bessemer rail and \$63 to \$65 for open hearth rail on recent inquiries. Two orders for track spikes for approximately 2,000 kegs each, received from the Baltimore & Ohio and the Lackawanna, are of interest, as no similar orders have been brought to notice for some time.

Since the War Industries Board allowed the scrap dealers a commission of 3½ per cent on scrap purchased at government prices, thereby ending a controversy of considerable duration, there has been increased activity in the scrap market. A considerable number of railroads are mentioned as having scrap for sale in quantities. The Railway Administration is calling attention to the need of reclaiming or selling all such material on hand. Quotations on old material are as follows: Rerolling rails, \$34 (less than 3 ft. long, \$31); frog and switch scrap cut apart, \$29; relayers, \$60 to \$70, all per gross ton. Scrap steel angle bars are quoted at \$27 per net ton. Prices on new track materials other than rails are all fixed as given in the material reports of previous issues.

Another development that has tended to stabilize market conditions has been a decision recently announced interpreting the rules governing the fixed prices of steel. This specifies that any iron or steel product delivered after April 1, 1918, under contract previous to the beginning of this year shall be paid for at prices not exceeding those in effect on the date of delivery. One steel commodity now greatly in demand, which has served for some time in the past as an alternative for materials not available, is bar steel rerolled from old rails. This has been used extensively for concrete reinforcing, particularly during the last year, but there is now an active call for it for use in farm implements and for posts in wire entanglements.

The purchase of ties, like that of rails, is behind schedule, although not in the same degree. This is now subject to the supervision of the regional purchasing committees, which are at present engaged in organizing and unifying tie purchases. The Western Regional Purchasing Committee recently appointed sub-committees for the purchase, inspection and handling of ties in various tie-producing districts. The personnel of these committees is given in full on another page of this issue. Some work is also under way on the standardization of tie specifications, but this has not been completed.

GENERAL NEWS DEPARTMENT

Senator Jones of Washington has introduced a bill in Congress to prohibit trespassing upon the cars or trains of common carriers in interstate commerce.

Snow in the week of April 26 blocked trains on the Creston, Ia., division of the Chicago, Burlington & Quincy and on the Rock Island near Beatrice, Neb.

The Atchison, Topeka & Santa Fe has applied to the Kansas Public Utilities Commission for authority to take up its track between Wellington and Caldwell, a distance of about 20 miles, as this line has not been used for several years, its trains running over the parallel line of the Chicago, Rock Island & Pacific.

The twenty-first annual meeting of the American Society for Testing Materials will be held at the Hotel Traymore, Atlantic City, N. J., on June 25, 26, 27 and 28. Wednesday afternoon, the 26th, will be devoted to topical discussions on Co-operation in Industrial Research, while the evening session on Thursday will be a joint meeting with the American Concrete Institute.

President Wilson has urged the continuation of construction work on the government railway in Alaska. Although labor is not plentiful in Alaska, the Alaskan Engineering Commission considers it advisable to furnish employment for what there is. There is much construction material on hand, and labor will not be any cheaper for several years at least. The commission asserts that while 65 per cent of the railroad is completed, more time will be required to build the unfinished third of the project than was required for the completed two-thirds.

Summary action by the government terminated labor difficulties in connection with the construction of the Pennsylvania freight terminal at Chicago. Several weeks ago when the Quartermaster's Department of the Army reserved space in the new building it was found that the electricians who were installing the wiring for the elevators were on a strike and that some other unions had gone out in sympathy. Despite the efforts of the government to induce the men to return to work the electricians remained obdurate. Finally on May 20 the government hired electricians belonging to an opposition union. United States troops have been placed on guard at the station and it is expected that wiring will now be completed in about six weeks.

The Minnesota Railroad and Warehouse Commission has adopted specifications for railroad track scales which will become effective on December 1, 1918, and which represent a more comprehensive treatment of this matter than has hitherto been attempted. These specifications are the result of a long period of constructive work on the part of the department of weights and measures in co-operation with the railroads, the scale manufacturers and the United States Bureau of Standards. In general, the specifications follow the ideas of the specifications prepared some time ago by the United States Bureau of Standards, but they are more complete, going into detail concerning the design and manufacture of all portions of the scale structure from foundation to beam house.

Employees of American railways made a most creditable showing in the Third Liberty Loan, as their subscriptions exceeded \$100,000,000 and are at least three and possibly four times as great as the total for the Second Loan. Based on incomplete figures available a short time after the campaign closed, the total amount subscribed was \$104,641,000, of which \$45,000,000 was subscribed by 660,000 employees in the Eastern Regional District, \$50,113,000 by 650,000 subscribers in the Western District and \$9,628,000 by those in the Southern District. The results are encouraging not only from the standpoint of money collected, but

also because of the large proportion of employees which participated. For instance, in the Western District, nearly 90 per cent of all the employees took part, the average subscription being \$77. Sixty-one roads reported that all of their employees had subscribed, and 177 roads said over 70 per cent participated. In this district the largest subscription was from the Southern Pacific System with \$4,530,000, with the Santa Fe next with \$4,000,000, while 13 roads subscribed over \$1,000,000.

The War Industries Board has commandeered practically the entire output of steel for the government, and a plan was outlined at a meeting of the American Iron & Steel Institute, at New York, the first week in May, by J. L. Replogle, the steel director for the War Industries Board, whereby the surplus remaining after the government's war needs have been met, together with a certain part of the output not required for such purposes, will have to answer for the non-war industries, under strict government supervision. Mr. Replogle further stated that too much steel was being absorbed by non-essentials and that the government's requirements would require practically the entire output. Among the requirements for steel, he mentioned the quantities needed for cars and locomotives, and added that the director-general of railroads had asked for a mill reservation for 2,000,000 tons of rails.

At the national convention of the American Association of Engineers at Chicago on May 14, the following officers were elected for the coming year: President, W. H. Finley, chief engineer, Chicago & North Western, Chicago; first vice-president, W. H. Clausen, assistant city engineer of Chicago; second vice-president, L. K. Sherman, president of the L. K. Sherman Engineering Company, Chicago; national directors to serve two years, Harold Almer, consulting engineer, Chicago; F. K. Bennett, principal assistant engineer, Minneapolis & St. Louis, Minneapolis, Minn.; T. M. Chapman, civil engineer, Central of Georgia, Atlanta, Ga.; J. N. Hatch, consulting engineer, Chicago; Alexander Potter, consulting engineer, of New York, and J. H. Prior, consulting engineer, of Chicago.

On May 6 a fire on the Pennsylvania Lines bridge over the Ohio at Louisville, Ky., which is undergoing reconstruction, did serious damage to the structure. The seat of the fire was the timber falsework and counterweight forms in the south tower of the vertical lift span over the government canal on the Kentucky side of the river. Owing to the location of the initial blaze high up on the tower, difficulty was experienced in fighting the fire, which was not extinguished for several hours and did serious damage to the steel work. Actual damage and the extent of the delay to the completion of the structure will not be known until a careful survey is made. The cause of the fire is not definitely known, but is assumed to be a spark from a passing locomotive.

ROADMASTERS' ASSOCIATION WORK

Among the subjects which have been selected for committee investigation and report by the Roadmasters' and Maintenance of Way Association this year are the following:

Data on Mechanical Devices Used in Track Maintenance; J. B. Oatman, roadmaster, Buffalo, Rochester & Pittsburgh, Du Bois, Pa., chairman.

Labor-Saving Devices; J. W. Powers, supervisor, New York Central, Rochester, N. Y., chairman.

Fencing, Including Cattle Guards, Farm Crossing Gates and Anchoring of Fences; Charles Newberg, roadmaster, Chicago & North Western, Mayfair, Ill., chairman.

A paper will also be presented on Best Methods of Raising Track by George Beckingham, superintendent of track, Grand Trunk, Montreal, Que.

The convention will be held at the Auditorium Hotel, Chicago, on September 17, 18 and 19.

PERSONAL MENTION

GENERAL

H. C. Phillips, general secretary of the Railroad Presidents' Conference Committee on Federal Valuation of Railroads with headquarters at Philadelphia, Pa., has resigned to become chairman of the Western Group of the Engineering Committee at Chicago. The offices of the Western Group were moved on May 1 to 110 South Dearborn Street, Chicago, where facilities have been provided for meetings of subcommittees which are making special studies of cost data and unit prices.

ENGINEERING

Tarzwil Ellett, Jr., assistant division engineer of the Baltimore & Ohio, with headquarters at Cumberland, Md., has resigned.

B. T. Johnson has been appointed supervisor of ditchers, steam shovels and work in connection therewith, on the Denver & Rio Grande, with headquarters at Denver, Colo.

L. G. Curtis, district engineer of the Baltimore & Ohio, with office at Chicago, has been appointed assistant chief engineer in charge of construction, with headquarters at Baltimore, Md.

Daniel Hubbard, division engineer on the Baltimore & Ohio Southwestern at Flora, Ill., has been transferred to the Newark division of the Baltimore & Ohio, with headquarters at Newark, Ohio, succeeding **C. R. Diermar**, who has been transferred.

H. L. Archbold has been appointed division engineer of the Tucson division of the Southern Pacific, with headquarters at Tucson, Arizona, succeeding **J. D. Mathews**, who has resigned.

D. Rounseville, engineer maintenance of way of the Chicago & North Western, at Chicago, has been appointed to the chief engineer, and the office of engineer maintenance has been discontinued.

H. G. McMeichen, chief engineer of the Utah Railway, with headquarters at Salt Lake City, Utah, has resigned to go with another company, being succeeded by **O. J. Egleston**, vice-president and general manager, who will assume the duties of chief engineer in addition to his regular duties.

J. G. Bloom, superintendent of the Chicago, Rock Island & Gulf, with headquarters at Amarillo, Tex., has been appointed division engineer of the Chicago, Rock Island & Pacific, with headquarters at Herington, Kan., succeeding **S. L. McClanahan**, who has resigned to enter the army.

H. D. Row, track supervisor of the Meadville division of the Erie at Jamestown, N. Y., has been appointed assistant division engineer of the Delaware and Wyoming divisions at Susquehanna, Pa., succeeding **C. M. Lewis**, promoted. Mr. Row was born at Galion, O., and was educated in the Galion public schools and the Ohio State University. He began railway work on the Erie as clerk to the track supervisor at Galion in June, 1906. He was made rodman at Youngstown in June, 1907, and in September of that year he left the service to attend the civil engineering department of Ohio State University. He re-entered the Erie service in June, 1912, engaging in track construction at the Marion, O., terminal yard. In August of that year he was appointed assistant engineer of the Kent division. In August, 1913, he was made assistant engineer in the general office at Cleveland, and in February, 1916, he was made track supervisor on the Meadville division, which position he held until he received his recent appointment as assistant division engineer at Susquehanna.

H. J. Hanlon has been appointed sanitary engineer of the St. Louis Southwestern Lines, with headquarters at Texar-

kana, Ark., succeeding **H. W. Van Hovenberg**, who has resigned to become sanitary engineer in the United States Public Health Service. This appointment was effective May 1. Mr. Hanlon was born on September 25, 1892, at Scammon, Kansas, and, after a course with the International Correspondence School, entered railway service with the St. Louis & San Francisco in October, 1911, as office boy. He was next made rodman and later draftsman. In 1913, he was made rodman for the Kansas City Southern, where he remained a year, when he went to the Gulf Coast Lines as a leveler and assistant building foreman. The next year, 1915, he returned to the Frisco, working in the transportation department, but remained there only a few months, when he left to go again with the Kansas City Southern as a rodman. His next position was with the Louisiana Railway & Navigation Company as a computer and transitman on valuation work. In July, 1917 he became draftsman with the St. Louis Southwestern, being later promoted to assistant engineer, which position he held when appointed sanitary engineer, as noted above.

Geo. H. Brown, who has been serving as principal assistant engineer in a temporary capacity on the Eastern Pennsylvania division of the Pennsylvania Railroad at Altoona, Pa., has been appointed principal assistant engineer, with headquarters at the same place. **Elmer Irving**, acting division engineer at Harrisburg, has been appointed division engineer of the Philadelphia division. **H. H. Garrigues** has been appointed division engineer of the Trenton division.

C. M. Lewis, assistant division engineer of the Delaware and Wyoming divisions of the Erie, has been promoted to division engineer of these divisions, with headquarters at



C. M. LEWIS

Susquehanna, Pa. He entered railway work with the Erie as a rodman on April 8, 1901, and was promoted to transitman on October 18, 1902. He was made inspector on construction work on January 1, 1906, and in September of the same year he was given charge of construction work. In June, 1909, he was made assistant division engineer on the Buffalo division, and on October 23, 1910, he was appointed supervisor. On February 15, 1916, he was promoted to division engineer of the Wyoming division, and on May 1, 1917, was made assistant division engineer of the Wyoming and

Delaware divisions and side lines, which position he held when promoted to division engineer of these divisions, as noted above.

TRACK

J. Maxwell has been appointed supervisor on the Kent division of the Erie, with headquarters at Ashland, O.

H. O. Whitney has been appointed general roadmaster of the Utah Lines of the Denver & Rio Grande, with headquarters at Salt Lake City, Utah.

C. Nelson has been appointed roadmaster, in charge of District 6½ of the Union Pacific, with headquarters at Green River, Wyo., succeeding **C. E. Stonehocker**, who has been transferred.

J. T. Davis, section foreman on the Georgia Southern & Florida, with headquarters at Unadilla, Ga., has been promoted to supervisor of track, with office at Valdosta, Ga. Mr. Davis began railway service with the Georgia Southern & Florida as section foreman in May, 1904, and served continuously in that capacity until his recent promotion.

W. H. Penfield, assistant to the vice-president of the Chicago, Milwaukee & St. Paul at Chicago, has been appointed engineer of track maintenance, with the same headquarters, effective May 1.

R. C. Violet, division roadmaster of the St. Louis Southwestern, with headquarters at Mt. Pleasant, Texas, has been appointed general roadmaster of the Colorado Lines of the Denver & Rio Grande, with headquarters at Denver, Colo. A sketch of Mr. Violet's railway experience appeared in the *Railway Maintenance Engineer* for December, 1917, page 408.

James Kennedy, roadmaster on the Colorado Lines of the Denver & Rio Grande, has been appointed supervisor of all track of the first division of the same road, with headquarters at Pueblo, Colo. He was born in Ireland on May 27, 1877, and received a common school education, entering railway service as a section laborer with the Florence & Cripple Creek in 1898. Mr. Kennedy remained in this position with this road until 1903, when he was made foreman of construction. In 1903 he went to the Denver, North Western & Pacific as general foreman of construction. His next promotion was to the position of roadmaster, which he held in addition to that of general foreman of construction. It was this position he held when appointed supervisor of track, as noted above.

Stuart F. Porter has been appointed roadmaster of the first district of the Denver & Rio Grande, with headquarters at Colorado Springs, Colo., succeeding **James Kennedy**, who has been promoted. Mr. Porter was born at Wytheville, Va., on November 24, 1860, and graduated from the State Normal School at Warrensburg, Mo., in 1875. In September, 1882, he entered railway service as a section foreman with the St. Louis, Iron Mountain & Southern, and remained with this road until September, 1902, during which time he was promoted in turn to extra gang foreman and general foreman of construction. In the latter year he went to the St. Louis Southwestern as roadmaster of the Jonesboro division, with headquarters at Jonesboro, Ark., from which position he went to the Denver & Rio Grande as roadmaster, as noted above.

W. E. Stump, whose appointment as roadmaster on the Sioux City and Dakota division of the Chicago, Milwaukee & St. Paul, with headquarters at Yankton, S. D., was announced in last month's issue, was born at Montour, Iowa, in 1875. He received a common school education and in March, 1900, entered railway service as a section laborer with the Chicago & North Western at Tama, Iowa. The next year he was promoted to section foreman, a position he held until 1905, when he went to the Chicago, Milwaukee & St. Paul as yard and extra gang foreman on the Trans-Missouri division. For the next seven years he worked with this road on different divisions until 1912, when he was transferred to the Southern Minnesota division in the same capacity, and where he remained until appointed roadmaster at Yankton, as noted above.

E. C. Wolbridge, roadmaster in charge of lines from Napier, Neb., to Table Rock, and from Rulo to Atchison, Kan., on the Wymore division of the Chicago, Burlington & Quincy, with headquarters at Falls City, Neb., has been promoted to trainmaster and roadmaster in charge of the line from Holdrege, Neb., to Sterling, Colo., on the Sterling division, with headquarters at Curtis, Neb., succeeding P. H. Brennan. **J. M. Workman**, roadmaster on the Wymore division, with headquarters at Wymore, Neb., has been transferred to Falls City, succeeding Mr. Wolbridge. **William Billings** has been appointed roadmaster at Wymore in place of Mr. Workman. **C. E. Double** has been appointed roadmaster in charge of the line from Dietz, Wyo., to Billings, Mont., on the Sheridan division of the Chicago, Burlington & Quincy, with headquarters at Sheridan, Wyo., succeeding J. V. Donielson.

John Garrity, who has been appointed assistant roadmaster of the Milwaukee terminals of the Chicago, Milwaukee & St. Paul, with headquarters at Milwaukee, Wis., was born at Madison, Wis., on September 29, 1867. After being edu-

cated at the public school, he entered railway service with the Chicago, Milwaukee & St. Paul as a section laborer on March 26, 1886, where he remained until November, 1893, when he left to go to the Great Northern. He worked for this company for 22 years, serving in turn as section foreman, extra gang foreman, assistant roadmaster and division roadmaster. After being out of railway service for three years, he returned to the Chicago, Milwaukee & St. Paul, becoming assistant roadmaster, as noted above.

BRIDGE

H. P. Creighton has been appointed bridge and building master of the Canadian Pacific, with headquarters at Schreiber, Ont., succeeding **E. T. Draper**, transferred.

R. T. Waldrep, supervisor of track of the Georgia Southern & Florida, has been appointed supervisor of bridges and buildings, with headquarters at Valdosta, Ga. Mr. Waldrep began railway service with the Georgia Southern & Florida as supervisor on April 1, 1890, and has been in continuous service since that time, with the exception of eight months, when he was superintendent of the Gulf Line Railroad.

Thomas F. Bracken, bridge foreman of the Chicago, St. Paul, Minneapolis & Omaha, has been appointed general foreman of bridges and buildings of the Nebraska division, with headquarters at Emerson, Neb., succeeding **Charles Mines**, who has resigned. Mr. Bracken entered railway service with this company on July 7, 1897, as a carpenter, and remained in this position until May, 1903, when he was promoted to bridge foreman. It was this position he held when made general foreman of bridges and buildings as noted above.

E. Gunderson, acting general foreman on the Nebraska division of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at Emerson, Neb., has been appointed general foreman of bridges and buildings, with headquarters at Spooner, Wis., succeeding **John Stewart**, who has been assigned to other duties. Mr. Gunderson entered railway service as a carpenter on the Eastern division of the Chicago, St. Paul, Minneapolis & Omaha on August 1, 1898, and served in that capacity until May 1, 1909, when he was promoted to carpenter foreman, which position he held until December 21, 1917, when he was made acting general foreman, his next promotion being the one noted above.

J. B. McClain, assistant bridge engineer of the Seaboard Air Line, with headquarters at Norfolk, Va., has been appointed bridge engineer, succeeding **Guy Pinner**, who has resigned to accept service elsewhere. **W. C. Binford** has been appointed assistant bridge engineer, succeeding Mr. McClain. Mr. McClain was born in 1877, in Washington, Pa. Following four years of general engineering experience, he entered railway service with the Seaboard as masonry inspection in July, 1906. In 1908 he was promoted to inspecting engineer and three years later to resident engineer, where he remained until January, 1917, when he was made assistant bridge engineer, which position he held when made bridge engineer as noted above.

PURCHASING

The New York, New Haven & Hartford announces that on May 7 the purchasing department and stores department were consolidated, with headquarters at New Haven, Conn., and both departments are now known as the "supply department," under the supervision and management of **George G. Yeomans**, general purchasing agent, and **G. W. Hayden**, assistant purchasing agent. The supply agents, Lines East and West, will co-operate and rank with maintenance engineers and mechanical superintendents. The division supply agents will co-operate and rank with division master mechanics and division engineers.

OBITUARY

Jesse Lowe, contracting engineer, died at his home in Chicago on April 17. Mr. Lowe was born at Omaha, Neb., on January 17, 1861, and graduated from the Rensselaer Poly-

technic Institute, Troy, N. Y., in 1885. For a short time after his graduation he was assistant to the city engineer of Omaha, and assistant engineer in locating the Omaha Belt Line and in the preliminary and location surveys of the Missouri Pacific west of Omaha. In 1886 he was located at Lincoln, Neb., as resident engineer of the Missouri Pacific. In 1887 he formed a partnership at Omaha with **Andrew Rosewater** and **George B. Christie** for the purpose of engaging in civil engineering work. The following year the firm was dissolved and the firm of **Christie & Lowe** was organized for similar purposes. The firm did considerable railroad and bridge work for lines in the Middle West and river and harbor improvement work for the United States government.

IN GOVERNMENT SERVICE

Shelby S. Roberts, consulting civil engineer, Chicago, has joined the staff of the regional director of southern railroads at Atlanta, Ga.

C. E. Smith, formerly bridge engineer of the Missouri Pacific, has received a commission as major in the engineering branch of the quartermaster's corps. He is now stationed at Washington.

C. C. Keeble, recent storekeeper of the Gulf, Colorado & Santa Fe, at Galveston, Tex., has received a commission as first lieutenant in the quartermaster's corps, at Washington.

Charles M. Anderson, superintendent of safety of the Nashville, Chattanooga & St. Louis, has been appointed supervisor of safety of the southern regional district, with headquarters at Atlanta, Ga.

Walker D. Hines, assistant to the director general of railroads, with headquarters at Washington, has been appointed assistant director general of railroads with the same headquarters, effective May 20.

E. L. Mosley, assistant engineer in the valuation department of the Illinois Central, and **C. I. Anderson**, assistant engineer of the bridge and building section of the valuation department of the Illinois Central, have been granted leave of absence to serve as supervising engineers in the U. S. Government Explosives Plant "C," now under construction at Nitro, W. Va.

H. J. Bell, safety inspector of the Chicago & North Western, has been appointed safety supervisor of the railroads under the jurisdiction of the western regional director. Mr. Bell is in Washington at present, where he is familiarizing himself with his new work under the supervision of H. W. Belnap, manager of the Safety Section of the United States Railroad Administration. He expects to assume his new duties with headquarters at Chicago in about a month.

MORE ACKNOWLEDGMENTS OF TOBACCO SHIPMENTS

F. A. Poor, chairman of the Railway Regiments' Tobacco Fund, Chicago, has received acknowledgments of the receipt of shipments of tobacco from three railway regiments in France. **Ernest Graves**, lieutenant-colonel of the Fifteenth Regiment, U. S. Engineers, writes under date of March 16 that two shipments of tobacco have been received in good condition and distributed to the men. The first shipment contained 140 lb. of Bull Durham and 5 lb. of Tuxedo smoking tobacco and the second shipment contained 540 lb. of Bull Durham and 15 lb. of Lucky Strike. He stated that "There is no doubt but that the men greatly appreciated both shipments."

The Rock Island System's officers and employees have shipped tobacco costing \$324 and flashlight equipment costing \$330, to the former Rock Island men who now compose Company B, Thirteenth Engineers (Railways) in France. Because the train rules under which the men work do not permit the use of ordinary lanterns, it was thought that flashlights would be of service to them. Consequently, equipment sufficient to last the company over a year was forwarded, consisting of 184 flashlights, 1,122 extra batteries and 200 Mazda lamps.

CONSTRUCTION NEWS

The Railroad Administration has announced approval of capital expenditures by the railroads for the year to the amount of \$937,961,318. Of this total, \$440,071,000 is for additions and betterment. The details of this budget, together with a list of the expenditures authorized on the larger roads, will be found on another page of this issue.

The **Atchison, Topeka & Santa Fe** has been authorized by the Railroad Administration to resume the construction of the **Osage & Santa Fe** from Caney, Okla., to Pawhuska. The director general had previously ordered the Santa Fe to discontinue this work.

The **Atlantic Coast Line** plans to start work at once on the construction of a passenger station at Lakeland, Fla. The building will be two stories high and of brick construction. The work will be done by company forces.

The **Canadian Government Railways** has recently received bids for improvements at Halifax, N. S., to include a temporary station, mail, baggage, express and commissariat building, car repair building, two transit sheds, subway and water and sewer systems. The cost of the work will be about \$700,000.

The **Chicago, Burlington & Quincy** has awarded contracts to **G. A. Johnson & Sons**, Chicago, to construct a freight house and storehouse at Casper, Wyo. The freight house will be 50 ft. by 110 ft., 90 ft. of which will be two stories. It will be a steel frame structure resting on concrete foundations, with brick walls and a composition roof. The storehouse will be of brick construction, 48 ft. by 70 ft., on a concrete foundation and having a composition roof.

This railroad is also building a second track between Crawford, Neb., and Rutland, a distance of six miles. The contract for the grading has been awarded to **Sprague & Neisly**, while all the tracklaying will be done by the company's own forces.

This road has ordered from the American Bridge Company steel for five 100-ft. turntables for Eola, Ill.; Edgemont, S. Dak.; Bridgeport, Neb.; Seneca, Neb., and Denver, Colo. The last-mentioned table is for the use of the Colorado & Southern.

This company has awarded a contract to **E. Otto** of Downers Grove, Ill., for the construction of a 10-stall brick roundhouse at Bridgeport, Neb.

The **Chicago Great Western** has ordered a 100-ton capacity coaling station from the Railroad Water & Coal Handling Company, Chicago, to be built at Talmadge, Ia.

The **Chicago & North Western** has completed plans for the north approach of the Orleans street bridge over the Chicago river, Chicago. The bridge will be built by the city, but the north approach which crosses the North Western tracks will be constructed by the railroad. The North Western has also awarded contracts to the **Widell Company**, Mankato, Minn.; **Gaffin & Gehri**, Fond du Lac, Wis., and **Adolph Green**, Green Bay, Wis., for concrete work in connection with the construction of 35 bridges on various divisions of the road.

The **Denver & Rio Grande** has awarded a contract to the **Utah Construction Co.** in connection with the construction of a new freight and engine terminal at Soldier Summit, Utah. This will consist of division terminal tracks to hold 1,000 cars with a total trackage of 15 miles, including repair tracks, a wye and engine terminal tracks. The engine terminal will contain a rectangular engine house of 24 stalls, a power house, a small shop and store house, oil house, ice house; coal, ash and sanding facilities; a car shop, a station and office building, hotel for employees and 24 cottages for employees and section builders. The work will require 430,000 cu. yd. of grading and 2,500 cu. yd. of masonry.

The Illinois Central has awarded a contract to T. S. Leake & Co., Chicago, to erect an inbound freight house at East St. Louis, Ill., at an approximate cost of \$150,000. The building will be a one-story structure, 50 ft. by 612 ft., except for a section at the middle of the building 38 ft. by 28 ft., where second-story space will be provided for office purposes. It will be a brick building, similar to the outbound freight house constructed last year.

This road has also awarded a contract to the Ferro Construction Company, Chicago, to erect the steel superstructure of the new St. Charles Air Line bridge, Chicago, and to remove the old bridge. The steel for the new bridge was purchased from the American Bridge Company late in 1916.

The Nashville, Chattanooga & St. Louis has been granted a permit to build a two-story brick extension to the office building in Nashville, Tenn., the estimated cost of which is \$16,500.

The Pennsylvania Railroad has awarded contracts to Cuthbert Brothers, Pittsburgh, Pa., to put up the following buildings at West Brownsville, Pa.: A five-stall engine house and machine shop, 132 ft. by 120 ft., on concrete foundations, to be of frame construction, with wood block floor, metal siding and slag roof; a storeroom office and oil house 30 ft. by 75 ft., two stories high, on concrete foundations, and of frame construction, with wood block floor and metal siding; and a power plant 40 ft. by 80 ft., on concrete foundations, and of frame construction with metal siding. The total cost of the work will be about \$65,000.

The Philadelphia & Reading has awarded a contract to C. P. Bower to rebuild bridge No. 57, north of Hellertown, Pa., on its Bethlehem branch, which is a stone arch structure carrying two tracks. The new bridge is to be a concrete box structure with 26-ft. clear span over a public road, with top reinforced with steel I-beams, and will carry 15 tracks.

The Quebec & Saguenay has awarded a contract to O'Brien & Doheny, Quebec, Que., to build a line through St. Francois Xavier, Que., Baie St. Paul, Eboulements, St. Frenee, and Murray Bay. The work will be difficult, as it requires the building of a number of temporary trestles, which later are to be replaced with steel bridges. Track has already been laid on 26 miles.

The St. Louis Southwestern has ordered from the Roberts & Schaefer Company, Chicago, two automatic electric coal-planting plants, which will be of reinforced concrete and of 200 tons' capacity, to be installed at Commerce, Tex., and Jonesboro, Ark. These plants are duplicates of the plant that was recently installed for this road at Valley Junction, Ill.

The Southern Pacific has been ordered by the Public Service Commission of Oregon to eliminate the grade crossing of the West Side highway with the Newberg branch of the West Side division of the Southern Pacific in Washington county, Oregon.

This road has completed plans for enlarging and lining with concrete 17 tunnels through the Tehachapi mountains and work will be started soon. This work will be done by pneumatic methods, the concrete mixer being located at the portal of the tunnel and the material being conveyed to place by air pressure. The Houghton Construction Company, San Francisco, has the contract for this work.

TRACK MATERIAL

The Chicago Great Western has ordered four pneumatic tie tamping machines from the Ingersoll-Rand Company, Chicago.

The Los Angeles & Salt Lake has offered the following rail for sale for use in necessary industrial, logging and mining tracks and other necessary work: Forty-seven track miles of 75-lb. rail; eight track miles of 60-lb. rail; three track miles of 56-lb. rail and 13 track miles of 52-lb. rail. The Western Pacific wishes to sell 1,000 tons of 35-lb. rail and 2,000 tons of 40-lb. rail.

SUPPLY TRADE NEWS

GENERAL

The H. W. Johns-Manville Company announces that after July 1, 1918, its Houston office will be located at 424-426 Washington avenue, Houston, Texas.

The Concrete Mixing and Placing Company, Chicago, has leased six of its machines to the Houghton Construction Company, San Francisco, Cal., for use in the lining of 17 tunnels on the Southern Pacific lines crossing the Tehachapi mountains.

The National Lumber Manufacturers' Association held its sixteenth annual meeting in the Congress hotel, Chicago, May 20 and 21. About 150 representatives of manufacturers, retail dealers and consumers of lumber participated in the meeting, which considered some of the special problems confronting the lumber industry at this time. Following the meeting an economic conference was held on May 22 for the discussion of cost economics as related to the production of lumber.

The Manganese Track Society met at the Hotel Blackstone, Chicago, on May 16, and elected officers for the coming year. Knox Taylor, president of the Taylor-Wharton Iron & Steel Company, Easton, Pa., was elected chairman, succeeding A. H. Mulliken, president of the Pettibone-Mulliken Company, Chicago. O. de G. Vanderbilt, president of the Weir Frog Company, Cincinnati, Ohio, was elected vice-chairman in place of R. W. Gillespie of the Bethlehem Steel Company, South Bethlehem, Pa., and Henry Elliot, president of the Elliot Frog and Switch Company, East St. Louis, Ill., becomes treasurer in place of R. J. Davidson, treasurer of the Ramapo Iron Works, Hillburn, N. Y. B. M. Fosgate, Chicago, continues as secretary.

The Austin Company, Cleveland, O., announces that G. E. Lemmerich has joined the engineering staff of that company, to devote his entire attention to the design of railway terminal buildings, having specialized in this work with the various railroads in the United States for a number of years. Mr. Lemmerich began his railway career in 1881 as axeman for the Pennsylvania and has been connected with railway terminal layout work for over 20 years. In 1898 he was with the Central Railroad of New Jersey on engine terminals, freight terminals and on special work in connection with the Elizabethport shops. In 1902 he was employed by the Delaware, Lackawanna & Western on freight car repair shops, at Scranton, and in 1903 at Jersey City on the proposed terminals for the Erie. In 1904 Mr. Lemmerich was with the Northern Pacific, working on layouts for division terminals. During the past eight years he has been associated with the design of freight terminals on the Illinois Central and the Chicago & Western Indiana, and with the design of engine terminals on the Western Maryland. The Austin Company, which has specialized in the construction of standard buildings, erected in 30 to 90 days, is now designing engine terminal, shop and other railway buildings for similar rapid construction.

PERSONAL

N. D. Chapin has been appointed director of the interstate commerce and railway traffic department of the La Salle Extension University, Chicago.

F. E. Lauderback, formerly in charge of the southern territory for the National X-Ray Reflector Company, with office at St. Louis, Mo., has resigned and that office has been abolished.

Albert Tate Smith, lately manager of the R. U. V. Company, 50 Broad street, New York, has returned to the Permutit Company, with which he was formerly connected, to assume the position of assistant manager of sales.

The Ogle Construction Company, Chicago, has moved its offices from the McCormick building to 1504 Steger building, 28 East Jackson boulevard.

Press G. Kennett, southern railway sales manager for the Flint Varnish & Color Works, with headquarters at St. Louis, Mo., has been appointed western railway sales manager, with office at Chicago, succeeding **Rex W. Hudson**, who has resigned to engage in other business. **J. C. Jonas** has been appointed southern railway sales manager at St. Louis, succeeding Mr. Kennett.

C. Z. Moore, supervisor on sub-division No. 4 of the Philadelphia division of the Pennsylvania Railroad, with headquarters at Middletown, Pa., tendered his resignation, effective May 1, to associate himself with **John Lundie**, consulting engineer, 52 Broadway, New York, inventor and producer of the Lundie tie plate. Mr. Moore entered the service of the Pennsylvania Railroad in the division engineer's office at Harrisburg, Pa., on October 1, 1894. One year later he was transferred to the construction department, where he assisted for several years in heavy construction work. Later he returned to the maintenance of way department and served as transitman, assistant supervisor and supervisor at various points on the system. For the past few years he has been most successful in work as a track engineer, having taken in competition the general manager's prize for five consecutive years, the award of which is made for the greatest improvement and the best track on the system and superintendent's division. Mr. Moore will represent Mr. Lundie, with office in the Finance building, Philadelphia, Pa.



C. Z. MOORE

H. A. Jackson, whose election as president of the Chicago Pneumatic Tool Company, Chicago, was announced in the May issue, was born in Bethlehem, Conn., on July 7, 1881. He is a graduate of the Lawrence Scientific School of Harvard University, class of 1903, but devoted an additional year to a special course in metallurgical work in the graduate school there. Mr. Jackson entered the employ of the Bethlehem Steel Company in July, 1904, where he served an apprenticeship in the various departments of the works, thus gaining practical experience and an intimate acquaintance with the steel business by personal contact with the production end. He later entered the sales department of the Bethlehem organization. A number of years ago Mr. Jackson was sent to Boston to open the Bethlehem Steel Company's office there and to organize its sales and executive forces in that territory. He continued in the position of sales agent at Boston until his election as president of the Chicago Pneumatic Tool Company at a special meeting of the board of directors held in New York on April 19. He is not an



H. A. JACKSON

entire stranger in Chicago, where he now has his headquarters, as he was sales agent in that city for the Bethlehem company for several months early in his career. As president of the Chicago Pneumatic Tool Company he succeeds **W. O. Duntley**, resigned.

R. G. Stutsman, for a number of years superintendent of the frog and switch shop of the Chicago, Milwaukee & St. Paul at Tomah, Wis., and more recently master mechanic of the Four Lakes Ordnance Company, Madison, Wis., has been appointed sales representative of Manning, Maxwell & Moore, at Milwaukee, Wis.

E. C. Peck, superintendent of the Cleveland Twist Drill Company, Cleveland, Ohio, has received an appointment as lieutenant-colonel in the engineering bureau of the ordnance department. Mr. Peck will have charge of the gages used in the production of munitions and kindred materials for the above department, and his duties will be the supervision of design of gages and the setting of limits of variance which will be satisfactory to both manufacturer and the ordnance department.

TRADE PUBLICATIONS

Switch Stands.—The Ramapo Iron Works, Hillburn, N. Y., has just issued its Pamphlet No. 17, descriptive of the Ramapo automatic safety switch stands. This is a 16-page book with illustrations, and shows in detail the character of construction and the manner of operation of this type of switch stand.

Library Catalog.—The Portland Cement Association, Chicago, Ill., has issued a 60-page catalog of the books, periodicals and pamphlets contained in its reference library on the literature on the cement industry. This library, which is open to the public, contains a large amount of information on the various phases of this field of engineering.

Clam-Shell Buckets.—The Blaw-Knox Company, Pittsburgh, Pa., has issued an attractive 24-page booklet printed in colors, describing its single line clam-shell buckets. The booklet describes the uses to which this bucket may be adapted and shows it in various positions. The book also contains data regarding weights, dimensions and clearances.

Hand Tools.—The Warren Tool & Forge Company, Warren, O., has issued its catalog No. 2, illustrating and indexing the line of special hand tools manufactured by that company. These include various forms of picks and mattocks, crowbars, lining bars, etc., heavy hammers and sledges, wedges and track wrenches and rail tongs and tie tongs. Each special form of each class of tools is illustrated.

Construction Equipment.—The Waterloo Cement Machinery Corporation, Waterloo, Iowa, has issued a new catalog No. 29, dated May, 1918, which contains 60 pages descriptive of its product. This includes various sizes of styles of concrete mixers, gas engine hoists, pumps and air compressors, together with special applications of this equipment.

"After Fifty Years."—The United States Switch Company, Eau Claire, Wis., has issued an elaborate 32-page book describing its automatic switch lock for the protection of facing-point switches. The design and construction of this device are described in detail as well as its service in high-speed main lines extending over a period of more than six years. The book is attractively prepared and the information is presented in a concise manner.

Railway Water Supply.—The Layne & Bowler Company, Memphis, Tenn., has issued an illustrated 64-page booklet. In this are described the Layne vertical turbine pumps and the Keystone well screens manufactured by that company for use in deep wells. This equipment is described in detail and illustrations are given of installations. A part of the book is devoted to an exposition of the plan of this company for developing water supplies in the dual role of engineer and contractor, under a contract stipulation guaranteeing a certain water discharge for the source developed. The last 8 pages are devoted to tables and formulae of use in water service problems.

No. 6

quar-
them
resi-
ceeds

nt of
& St.
manic
, has
ell &

Drill
nt as
nance
used
r the
on of
which
nance

N. Y.,
f the
-page
racter
rpe of

, Chi-
eriod-
on the
ich is
nation

Pitts-
rinted
The
ay be
k also
ances.

War-
index-
com-
tstocks,
edges,
tongs.

Ma-
a new
pages
zes of
nd air
f this

mpany,
ok de-
of fac-
of this
high-
an six
mation

mpany,
ooklet.
ps and
mpany
detail
of the
s com-
ole of
a guar-
eloped.
of use